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Idaho Operations Office

Technology Evaluation Scope of Work for the V-Tanks, TSF-09/18, at Waste Area Group 1, Operable Unit 1-10

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Prepared for the
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ABSTRACT

This technology evaluation scope of work outlines three types of technologies being considered for treatment of waste located in the V-tanks at Test Area North and falling under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). These technologies include

- Vitrification
- Thermal desorption and stabilization
- Chemical oxidation and stabilization.

This scope of work outlines the process for collection of data and information, such as conceptual designs, process flowsheets, and rough-order-of-magnitude costs, regarding the technologies that will be obtained and compared against the nine established CERCLA criteria. These results, plus selection of a preferred alternative, will subsequently be documented in a technology evaluation report. That report will establish the basis for the proposed plan and record of decision amendment.

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ACRONYMS

AOC	area of concern
ARAR	applicable or relevant and appropriate requirement
BBWI	Bechtel BWXT Idaho, LLC
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CO/S	chemical oxidation and stabilization
DOE	U.S. Department of Energy
EPA	U.S. Environmental Protection Agency
ESD	explanation of significant difference
ICDF	INEEL CERCLA Disposal Facility
INEEL	Idaho National Engineering and Environmental Laboratory
INTEC	Idaho Nuclear Engineering and Technology Center
LDR	land disposal restriction
OU	operable unit
PCB	polychlorinated biphenyl
PCE	tetrachloroethene
PEW	process equipment waste
RA	remedial action
RCRA	Resource Conservation and Recovery Act
RD/RA	remedial design/remedial action
ROD	record of decision
TAN	Test Area North
TCE	trichloroethene
TCLP	toxicity characteristic leaching procedure
TD/S	thermal desorption and stabilization
TMFA	Transuranic and Mixed-Waste Focus Area

TSCA	Toxic Substances Control Act
TSDF	treatment, storage, and disposal facility
TSF	Technical Support Facility
UHC	underlying hazardous constituent
VOC	volatile organic compound

Technology Evaluation Scope of Work for the V-Tanks, TSF-09/18, at Waste Area Group 1, Operable Unit 1-10

1. INTRODUCTION

This technology evaluation scope of work identifies the scope, schedule, and estimated cost for evaluating three primary technology alternatives for the V-tanks remedial action at Test Area North (TAN), one of eight primary facility areas at the Idaho National Engineering and Environmental Laboratory (INEEL). The decision was made to evaluate these technologies as replacements for the current record of decision (ROD) alternative (DOE-ID 1999), because no off-INEEL facilities capable of treating the tank contents waste are currently available. The scope and schedule in this document address the tasks of developing technical and functional requirements for each technology; obtaining current technology information from technology vendors; assessing and ensuring all data gaps and uncertainties are addressed; developing conceptual designs and cost estimates for each technology alternative; performing a comparative analysis of the alternatives against the criteria in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); and providing a recommendation for a new preferred alternative.

The results of the technology evaluation will be documented in a technology evaluation report. It is anticipated that a new proposed plan and ROD amendment will be prepared and issued after the evaluation report is issued. The scope and schedule for these will be further developed in the evaluation report and will include establishment of an enforceable date for submitting the draft ROD amendment.

1.1 V-Tanks Background and Data

The V-tanks discussed in this document consist of four underground stainless-steel tanks located at TAN. The V-tanks are part of Operable Unit (OU) 1-10 (the specific areas discussed are referred to as Technical Support Facility [TSF]-09 and -18), and the primary focus of the remedial action discussed in this document centers on the contents of the tanks, recognizing the entire area of concern (AOC) (for example, the surrounding soil and piping) must be remediated. The V-tanks were installed in the early 1950s as part of the system designed to collect and treat radioactive liquid effluents from TAN operations. All of the V-tanks now contain a liquid and sludge layer, and all of them lack secondary containment. The tops of three of these tanks (V-1, V-2, and V-3) are approximately 10 ft below the ground surface, while the top of the remaining tank (V-9) is 7 ft below grade. Table 1 summarizes the tank capacities and contents. Table 2 shows some of the key contaminants of concern for V-tank sludge.

Table 1. V-tank volume data.

Tank	Capacity (gal)	Liquid Volume (gal)	Sludge Volume (gal)	Total Volume (gal)
V-1	10,000	1,164	520	1,784
V-2	10,000	1,076	520	1,596
V-3	10,000	7,648	652	8,300
V-9	400	70	250	320
Total	30,400	9,958	1,942	11,900

Table 2. V-tank sludge data.[a]

Contaminant	V-1	V-2	V-3	V-9	Average[b]
Polychlorinated biphenyl (PCB), mg/kg[c]	412	228	327	301	320
Trichloroethene (TCE), mg/L	<12	<0.64	<0.62	18,000 mg/kg	2,327
TCE, toxicity characteristic leaching procedure (TCLP), mg/L (regulatory limit: 0.5)	3.7	0.71	2.6	Not analyzed	2.4
Tetrachloroethene (PCE), mg/L	1400	475	455	530 mg/kg	752
PCE, TCLP, mg/L (regulatory limit: 0.7)	18.7	2.4	8.7	Not analyzed	9.8
Sulfate, mg/kg	815	79	126	45 mg/L	287
Chloride, mg/kg	229	75	59	493 mg/L	165
Total halides, mg/kg	523	772	853	Not analyzed	727
Total carbon, mg/kg	84,200	142,700	115,200	11,474	100,910
Aluminum, mg/kg	6,183	5,105	4,795	2,225	4,919
Calcium, mg/kg	17,480	34,050	31,325	5,465	25,018
Iron, mg/kg	27,800	19,800	16,500	9,635	19,526
Zinc, mg/kg	22,367	1,790	5,403	1,750	8,508
pH	7.68	7.76	7.45	7.57	7.61
Mercury, mg/kg	1,036	497	746	2,080	929
Mercury, TCLP, mg/L (regulatory limit: 0.20)	0.00001	0.00001	0.00001	0.180	0.00023
Cadmium, mg/kg	102	97	74	27	82
Cadmium, TCLP, mg/L (regulatory limit: 1.0)	0.317	1.185	0.166	0.985	0.585
Lead, mg/kg	1,287	1,300	1,052	566	1,119
Chromium, mg/kg	1,124	1,355	754	1,038	1,051
Total uranium, nCi/g	5.5	3.425	2.373	12.801	4.834
U-235, nCi/g	0.1593	0.0990	0.0729	0.3525	0.139
Transuranic, nCi/g	60.72	20.45	31.70	35.09	36.89
Sr-90, nCi/g	7,708	13,700	21,622	6,405	13,816
Cs-137, nCi/g	8,806	7,740	7,598	5,590	7,701

a. The values reported are averages for each tank and represent total constituent concentrations, except for the TCLP. Concentrations that are not related to volatile organic compounds (VOCs) are based on the wet sludge after gravity filtration. The data are based on 1996 samples, except that TCLP data for Tanks V-1, V-2, and V-3 are from 1993 samples and V-9 data are from 2001 samples. TCE and PCE totals are from 1993 samples (DOE-ID 2002a).

b. Weighted average using available data for each tank and volume data from Table 1.

c. PCBs for Tank V-1 sludge range from 150 to 660 ppm.

The liquid fraction in each V-tank is relatively benign compared to the sludge phase, as illustrated in Table 3.

Table 3. V-tank liquid data (1996 data).[a]

Contaminant	V-1	V-2	V-3	V-9	Average [b]
PCBs, mg/L	<0.10	<0.10	<0.10	0.036	<0.10
TCE, mg/L [c]	0.160	0.300	0.200	410	3.1
Chloride, mg/L	236	119	76	11	98.9
Total organic carbon, mg/L	60	105	35	3	45
Total suspended solids, mg/L	37	27	2	2	9
Mercury, mg/L (TCLP, regulatory limit: 0.20) [c]	0.370	<0.0001	<0.0001	0.563	~0.050
Cadmium, mg/L (TCLP, regulatory limit: 1.0) [c]	0.050	<0.0004	<0.0004	1.900	~0.020
Total uranium, nCi/mL	0.0197	0.0407	0.0138	0.2345	0.0189
Transuranic, nCi/mL	0.00037	0.00084	0.00010	0.260	0.0020
H-3, nCi/g	30,400	102,000	6,090	353,000	21,700
Sr-90, nCi/g	2,030	4,900	12,300	250,000	12,000
Cs-137, nCi/g	2,900	13,500	2,895	420	4,024

a. The values reported are averages for each tank and represent total constituent concentrations, except for the TCLP. All less-than (<) values are given at the detection limit for the specified constituent (DOE-ID 2002a).

b. Weighted average using volume data from Table 1. Note that current plans are to only remove and treat a major portion of the liquid in V-3 separately. The remaining liquid and sludge in each tank will be treated together.

c. TCE, mercury, and cadmium data for V-1, -2, -3 are from 1993; 1996 data are not available.

The data in Tables 2 and 3 were analyzed as two separate phases, and the previous remedial action plan was to treat each phase separately. However, most of the approaches now under consideration will probably treat a combination of sludge and water. (The exact quantities will be determined on a case-by-case basis.) The data above will, therefore, have to be used to calculate the waste form compositions to be treated, or the material will have to be resampled. In accordance with the definition of PCB remediation waste provided in the Toxic Substances Control Act (TSCA) outlined in 40 CFR 761, the V-tank waste should qualify as PCB remediation waste, which allows disposal at a permitted landfill at any PCB concentration. Therefore, treatment standards for identified toxicity characteristics, underlying hazardous constituents (UHCs) such as PCBs, and F-listed constituents (TCE) will be established under the Resource Conservation and Recovery Act (RCRA).

1.2 CERCLA Documentation History

A ROD for OU 1-10 at TAN was issued in 1999 (DOE-ID 1999). The remedy selected for the V-tanks involved removal of tank contents and off-INEEL treatment of the waste. The treated waste was then to be returned to the INEEL (or another permitted facility) for disposal. The soils and tanks were to be removed from the AOC and disposed of at the INEEL CERCLA Disposal Facility (ICDF).

To implement the selected remedy, a remedial design/remedial action (RD/RA) work plan was issued (DOE-ID 2002a). Just after work plan issuance, however, the facility destined to accept the waste encountered significant financial difficulties and was no longer a viable treatment destination. In addition, the estimated cost for implementing the remedy increased nearly three fold over the original estimate in the ROD, eliminating the identified cost advantage over other potential remediation technologies. Consequently, a decision was made to re-evaluate other viable technology alternatives as addressed in this scope of work.

2. TECHNOLOGY EVALUATION OBJECTIVES AND PROCESS

2.1 Objectives

The objective of the technology evaluation scope of work is to outline the re-evaluation process that will be used to identify a preferred alternative for the V-tanks. This includes identification of the separation and treatment alternatives considered, the criteria that will be used to evaluate the alternatives, and the data needed to allow an informed decision regarding the preferred alternative. In addition to identifying the technologies to be evaluated, other technologies not selected will be addressed, and the rationale for not selecting them will be provided.

2.2 Process

Figure 1 provides an overview of the process that will be used during the evaluation. Technology vendors will generate conceptual designs for the selected technologies. Bechtel BWXT Idaho, LLC, (BBWI) will generate conceptual designs for systems not covered by the vendors and oversee the vendor design efforts. These designs will be guided by technical and functional requirements established by the V-Tank Project team. The designs will include process flow diagrams and associated material balances in sufficient detail to allow development of an approximate schedule and a conceptual cost estimate (+50%, -30%). The cost estimate must consider all pertinent costs—such as those associated with RD/RA work plan issuance, waste disposal, and transportation—to ensure a life-cycle estimate can be provided. Material balances of the primary and secondary waste streams will be obtained to ensure compliance with the associated treatment, storage, and disposal facilities (TSDFs). Development of the design and implementation plan must provide enough information to allow evaluation of the various technology alternatives relative to the established criteria outlined in Section 3, Evaluation Criteria and Assumptions. This information will be summarized in an engineering design file for each alternative. The data, conclusions, decision-analysis approach, and preferred alternative will then be summarized in a technology evaluation report. That report will support preparation of a proposed plan and a ROD amendment.

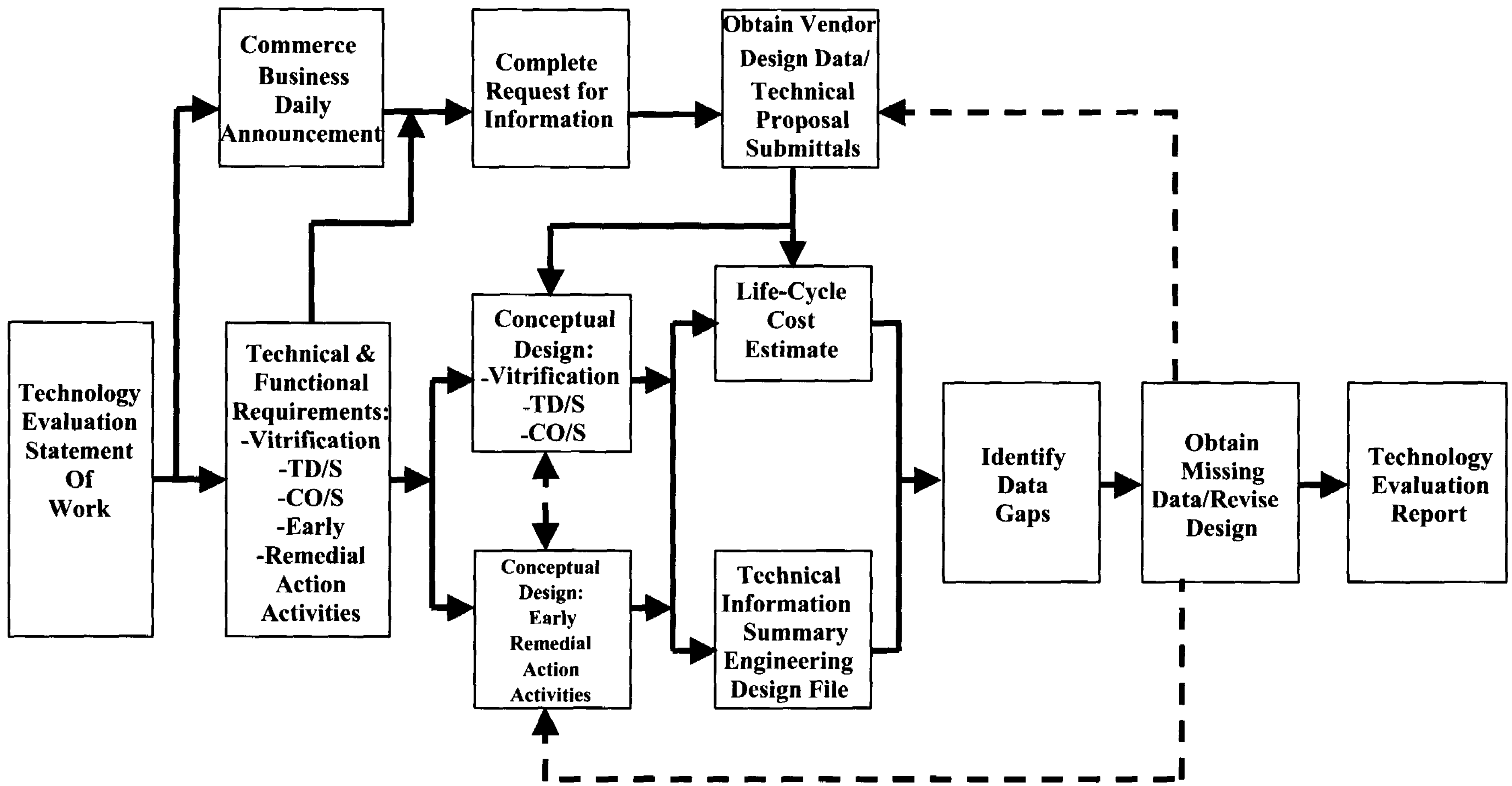


Figure 1. Technology evaluation process flow diagram.

3. EVALUATION CRITERIA AND ASSUMPTIONS

3.1 CERCLA Criteria

In accordance with CERCLA regulations (40 CFR 300.430[e][9][iii]), nine criteria that each alternative will be evaluated against are listed below:

- Threshold Criteria
  - Overall protection of human health and the environment
  - Compliance with applicable or relevant and appropriate requirements (ARARs)
- Primary Balancing Criteria
  - Long-term effectiveness and permanence
  - Reduction of toxicity, mobility, or volume through treatment
  - Short-term effectiveness
  - Implementability
  - Cost
- Modifying Criteria
  - State/support agency acceptance
  - Community acceptance.

Definitions of each of these alternatives are contained in various documents and will not be repeated here. Nevertheless, for some of these criteria, it is appropriate to identify specific items to be evaluated relative to the alternatives being considered. These items are as follows.

3.1.1 Overall Protection of Human Health and the Environment

A preliminary safety analysis will be performed for each alternative. The controls necessary to ensure the environment and personnel are safeguarded will be identified.

3.1.2 Compliance with ARARs

Three clarifications are necessary with respect to ARARs. First, due to mercury in Tank V-9 being > 260 ppm and statistically at the TCLP limit, treatment by either retort or incineration is required under RCRA land disposal restrictions (LDRs) if V-9 contents are treated separately. While vitrification and thermal desorption may meet the ARARs, chemical oxidation and grouting will not. Therefore, approval to use an alternative type treatment on the waste from Tank V-9 will be required by the approving agencies of the ROD (that is, the U.S. Department of Energy [DOE], the U.S. Environmental Protection Agency [EPA], and the Idaho Department of Environmental Quality, hereafter referred to as the "Agencies"), or identification of an alternative that would preclude the need for application of the RCRA-specified treatment technology will be necessary. The latter might be accomplished through additional sampling and analysis, combining of waste streams to aid in treatment, or other alternatives.

Second, data indicate certain phases are characteristically hazardous, requiring application of universal treatment standards for the UHCs. For example, the LDR limit (40 CFR 268) for PCBs as a UHC is 10 ppm. TSCA (40 CFR 761) has a 2 ppm limit. However, since TSCA is not driving actual treatment, the applicable RCRA/LDR limit will be used.

Third, certain treatment and disposal sites may not currently have permits to accept V-tank waste, but if these TSDFs are actively pursuing a permit and responses appear favorable for obtaining the permit, consideration will be given to including that option. For the evaluation process, this will likely include an interim storage step until the permit can be obtained.

3.1.3 Long-Term Effectiveness and Permanence

Each of the alternatives being considered will remove the treated waste from the V-tank AOC to the ICDF or to a permitted disposal facility. If removal of in situ treated waste later proves impractical, the long-term effectiveness of leaving the material in place will generally be judged as less favorable. Furthermore, the integrity of the disposed material will be a factor. Although all disposal alternatives will be in accordance with ARARs and waste acceptance criteria, certain waste forms are known to be less susceptible to leaching than others (for example, vitrified glass).

3.1.4 Reduction of Toxicity, Mobility, or Volume Through Treatment

Each of the treatment alternatives will reduce toxicity in compliance with regulations and applicable waste acceptance criteria. Certain treatment alternatives are also known to reduce mobility better than others. Volume reduction will consider not only the primary waste streams but, to the extent possible, the secondary waste streams. Another related consideration is the ability of the treatment alternative to disposition other related waste forms, such as V-tank piping and waste generated from past V-tank sampling activities.

3.1.5 Short-Term Effectiveness

A key factor for this criterion is risk to personnel and the environment during the actual treatment operation. Unless specific reasons dictate otherwise, in situ treatment will generally be viewed as more risk-averse than ex situ treatment options. This is because removal of the material from the tanks has an inherently higher risk, since personnel exposure and the potential for leaks to the environment are increased. However, in situ treatments may pose other risks, such as potential exposure during treated-waste-removal activities. These risks will be addressed in considerable detail during the evaluation process.

Also important in this category is the timeliness for deployment. Alternatives that cannot be deployed for several years have not been considered, because other proven technologies are available and immediately deployable. With site closure of high-risk areas being accelerated and in accordance with CERCLA guidance to make continuous, measurable progress on post-ROD remedial actions, delaying action is unacceptable. The V-tanks have exceeded their design life and have no secondary containment, making their environmental risk sufficiently high to warrant remedial action versus continued research into other treatment alternatives.

3.1.6 Implementability

Design complexity will be a key consideration for this criterion. While some processes will be relatively simple, they may generate waste streams that are more difficult to dispose of. Furthermore, some accident scenarios are more difficult to mitigate than others.

Several alternatives could be deployed immediately, having completed necessary treatability studies and obtained various regulatory permits. Deployment of other technologies may require additional studies, permits, or regulatory variances before direct application on waste forms as complex as those in the V-tanks. Various groups have studied different technologies for treatment of wastes similar to the V-tanks. For example, a DOE advisory board was formed to evaluate alternative technologies for treatment of PCB-contaminated transuranic wastes (DOE 2000). Previous work such as this will be utilized during the evaluation process.

Also considered will be previous demonstrations of comparable treatments. First-time applications will be considered but probably will not score high relative to this criterion.

Each of the technologies identified require some form of on-INEEL treatment, since no off-INEEL treatment facility is currently available for V-tank waste. This requires each operation to be enveloped by an appropriate safety analysis. Data from past activities with comparable waste streams are crucial to ensure a complete safety envelope.

Another factor that will be addressed under this criterion is the capability of the selected process to disposition other V-tank investigation-derived and secondary wastes as well as other comparable waste streams. For example, approximately 80 gal of PCB-contaminated mixed waste was generated from the Auxiliary Reactor Area-16 tank remedial action. Another possible source of material requiring treatment is the sludge from the PM-2A tanks located at TAN. Although the OU 1-10 ROD assumes the PM-2A waste will not require treatment, sample results are limited and the ROD recognizes the possibility that treatment may be required. Some of the alternatives being considered may be able to process other wastes at the same time V-tank wastes are processed. With vitrification, for example, the diatomatious earth in the PM-2A tanks could be used as frit for the melter.

3.1.7 Cost

A conceptual cost estimate will be developed for each of the alternatives selected (+50%, -30% accuracy). This estimate will include information obtained from BBWI engineering and cost-estimating personnel as well as various vendors. Life-cycle estimates will be obtained and used for comparison. The previous design (retrieval and off-INEEL treatment) was estimated at $32 million and will form the basis for subsequent comparisons.

3.1.8 State/Support Agency Acceptance

In as much as possible, this criterion will focus on regulatory implementation. For example, if a technology requires a variance, this will be considered in light of the practicality and precedence of obtaining the waiver.

3.1.9 Community Acceptance

Some of the technologies being considered were presented to the public before the ROD was approved. Therefore, the project already has considerable public input. Due to the nature of some of the treatment processes required (for example, thermal), the project will endeavor to ensure public concerns are addressed sufficiently. A fact sheet on the various technologies being considered will be issued early in the evaluation process to inform the public of the need to consider other alternatives and to seek public input. Another consideration will be the disposal location for the various waste streams. All of the alternatives involve some on-INEEL treatment, but some involve additional off-INEEL treatment and disposal that may receive greater local public acceptance while creating greater transportation and out-of-state concerns.

3.2 Key Assumptions

The following is a list of key assumptions applicable to the evaluation process:

1. The ICDF will be constructed and available to accept V-tank waste. The resultant waste forms produced from a particular remediation technology must be able to comply with the ICDF waste acceptance criteria (DOE-ID 2002b) or other designated TSDF.

2. The facility originally destined to accept the V-tank waste will remain a non-viable option.

3. Sufficient data exist from previous treatability studies on V-tank waste (simulated or actual) or comparable waste streams such that additional treatability studies are not required for selection of a preferred alternative. (Note: This does not preclude conducting laboratory or pilot-plant studies to refine design parameters.)

4. The Agencies will approve the chemical oxidation and stabilization process as an acceptable alternative to incineration or retorting for the treatment of Tank V-9 mercury waste, or an alternative approach will be identified that precludes the need for the treatment variance.

5. The V-tank waste is F-listed and characteristically mixed hazardous waste and will be managed under RCRA. The waste is also a TSCA waste and will be managed as a PCB remediation waste with respect to PCB disposal.

6. In establishing the final concentration of the contaminant of concern, the concentration in the final waste form after all the necessary treatments will be used (for example, grouted waste following chemical oxidation).

7. In establishing the concentration (total or TCLP) of a contaminant, the concentration in the waste form within each tank will be used to establish the requisite treatment standard. This will generally include a mixture of sludge and liquid. In the event tank contents are combined before treatment, the method to determine contaminant concentration will have to be determined on a case-by-case basis considering the point of generation.

8. Piping, tanks, soil, and secondary wastes such as personnel protection equipment and used equipment can be decontaminated sufficiently to allow disposal without additional treatment.

9. Per the detailed work plan, TAN-615/616 will be removed down to their foundations in Fiscal Year 2004, eliminating interference issues with V-tank remedial actions planned for Fiscal Year 2005. Other adjacent buildings (TAN-607, -633, and -649) will not interfere with the remedial action.

4. TECHNOLOGY ALTERNATIVES

This section briefly discusses the previous path forward as a means of comparison with the alternatives currently under consideration. Several potential early remedial action activities are also presented. Most of this section focuses on the three technologies and associated alternatives under consideration. The rationale for down-selecting to these technologies is also provided.

4.1 Previous Approach

As a basis for comparison, the previous path forward for disposition of the V-tanks is shown in Figure 2 and briefly discussed below.

The ROD directs removal of tank contents and off-INEEL treatment. The process design had been completed and approved in the RD/RA work plan. The process design involved removing tank contents and separating the liquid and sludge fractions through filtration. The filtered sludge was to be dewatered and collected in 55-gal drums that were to be held in interim storage before transport to the off-INEEL thermal treatment process. Off-INEEL treatment involved vitrifying the waste, which would destroy the hazardous organics (for example, PCBs) and glassify most of the hazardous metals and radionuclides. The glassified waste was then to be returned and disposed of at the ICDF (or another disposal site). The liquid portion of the tank contents was to be processed through a series of filters and ion exchange columns to meet LDRs. The liquid was then to be solidified and disposed of at the ICDF. Furthermore, the soil, tanks, piping, and other wastes were to be characterized and disposed of at the ICDF. As indicated earlier, this path forward was abandoned.

It should also be noted that other potential off-INEEL vitrification processes might become available in the future. However, these facilities probably will not be on line for several years. Furthermore, these facilities (such as Hanford's Waste Treatment Plant) are being designed and operated for other high-priority waste streams, and considerable uncertainty remains relative to the processing queue for wastes such as those from the V-tanks. The off-INEEL remediation option will not be explored unless there is conclusive evidence that such an option is viable and commercially available at the time of the ROD amendment.

4.2 Early Remedial Actions

In advance of treating the V-tank contents on-INEEL, a number of early remedial action activities are planned to begin in Fiscal Year 2003. These actions can be performed in accordance with the existing ROD and are independent of the technology ultimately selected to treat the waste. An explanation of significant difference (ESD), an RD/RA work plan addendum, and a soil field sampling plan will be required to initiate these activities. The ESD is required because the liquid portion may be treated on-INEEL (versus off-INEEL), the RD/RA work plan addendum needs to reflect the early remedial action scope of work, and the field sampling plan revision needs to reflect the sampling required to further identify the extent of contaminated soil and soil removal. Planned early remedial actions include the following:

- Line flushing and removal – This involves flushing the process line between V-9 and the other three V-tanks to remove any residual sludge and facilitate ultimate disposal of the associated piping. Other piping in the area would be removed, and remaining lines would be capped where necessary. The removed piping would be sized and stored for eventual treatment and disposal with other V-tank waste or disposed of directly at the ICDF.

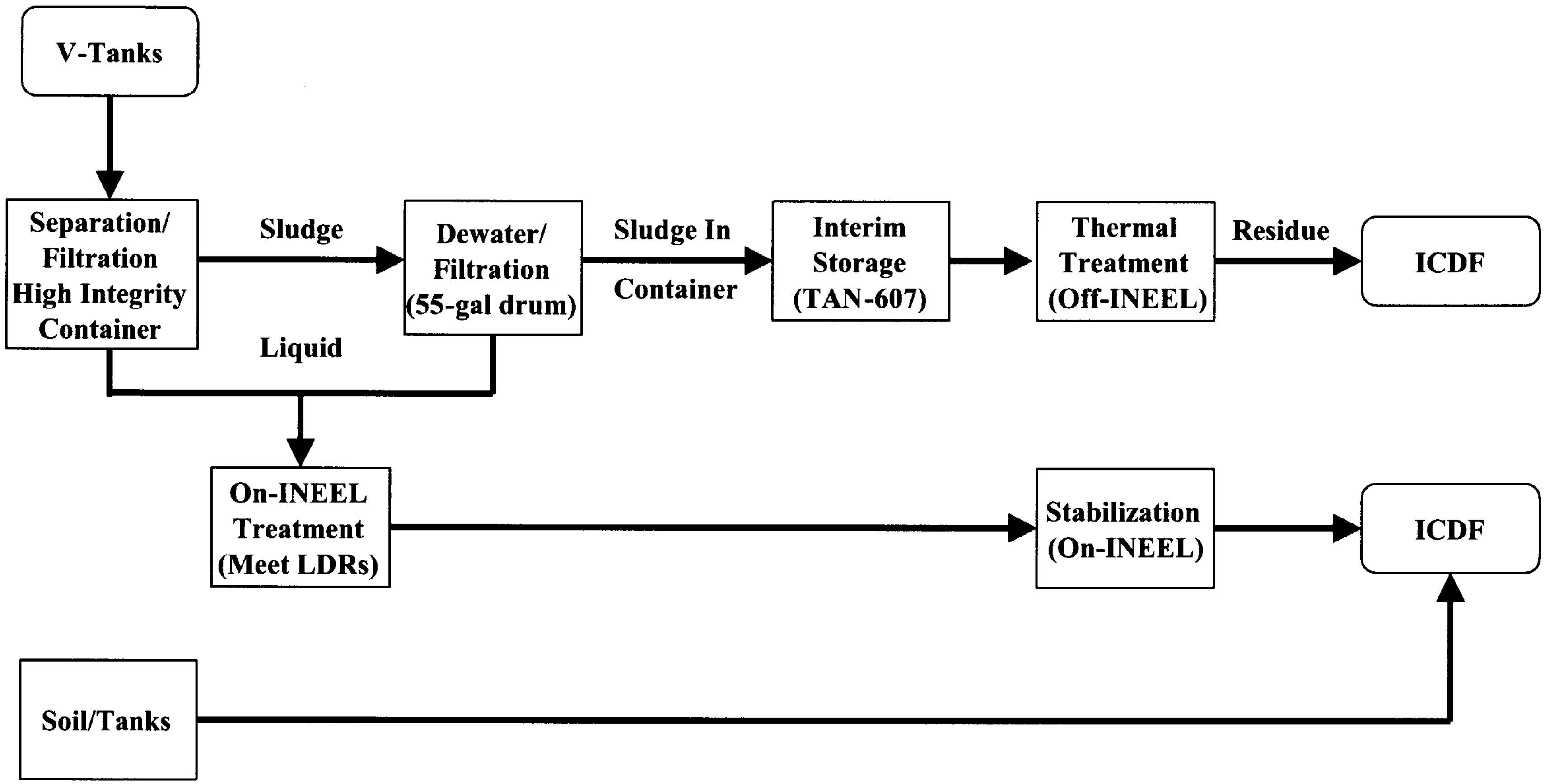


Figure 2. Flow diagram for the previous remedial design process.

- Line re-routing – The current waste process line that services the TAN hot shops and cells runs through the valve box (TAN-1704) in the AOC and connects to tanks in TAN-666. To ensure the line is protected during the remedial action, the line will be rerouted out of the AOC.

- Valve box removal – The valve box (TAN-1704) mentioned above will be removed from below grade and transferred to the Voluntary Consent Order Program for disposition. This valve box is covered and funded under the Voluntary Consent Order Program rather than CERCLA.

- Sand filter removal – The abandoned sand filter in the AOC and its associated contents will be removed and disposed of or, if necessary, stored for future treatment.

- Soil sampling and removal – During removal of the piping, sand filter, and valve box, sampling of the surrounding soil is planned. Depending on the results and technology selected, soil may also be removed and disposed of at the ICDF.

Depending on the technology alternative selected and other key decisions, additional early remedial actions may be undertaken. These include the following:

- Removal of a portion of liquid – Treatment and disposal of the liquid portion of the tank contents are relatively simple, with various on- and off-INEEL options available. Since all of the proposed technology alternatives benefit from reduced volumes of liquid, a design to achieve early removal of some of the liquid will be developed. This system will probably only be deployed in the V-3 tank, since it contains over 7,500 gal of liquid, but the system will also be capable of use in V-1 and V-2. It is anticipated that approximately 6,000 gal can be removed from Tank V-3, leaving an amount of liquid comparable to that found in V-1 and V-2. This is judged to be enough liquid in the tank to preclude entraining solids during the liquid removal process and to provide sufficient liquid to readily allow for subsequent sludge removal. The removal process can be simplified from the previous approach by decanting the liquid portion without entraining the solids, thus simplifying the subsequent liquid treatment process. Depending on the capabilities of the removal system and on the treatment technology selected, additional liquid from each of the tanks may be removed.

- Treatment and disposal options being considered for the decanted liquid waste include (1) on-INEEL treatment and disposal at the ICDF (comparable to the previous approach outlined in the RD/RA work plan), (2) on-INEEL treatment at the Process Equipment Waste Evaporator at the Idaho Nuclear Engineering and Technology Center (INTEC), and (3) off-INEEL treatment. If Option 1 is selected, removal and treatment may be postponed until the treatment process for the sludge is brought on-INEEL, since these processes will likely require off-gas treatment systems that could be used to treat the liquid fraction.

- Decontamination and demolition of TAN-615/616 – The current decontamination and demolition plan outlined in the detailed work plan for these two buildings calls for major activities to be conducted in parallel with the V-tank early remedial actions. According to the plan, both buildings will be removed down to their foundations before initiating the major treatment operations.

- Sludge consolidation – It appears there may be some benefit to sludge consolidation before treatment, particularly for some of the in situ treatment alternatives. Existing sludge removal systems are being designed and deployed on- and off-INEEL that could subsequently be utilized on the V-tanks with relatively minor modifications. These systems provide a means to homogenize the sludge and liquid for sampling, which might provide greater assurance of accurate sludge characterization. Depending on system availability and selection of the technology alternative, the early remedial actions could include sludge consolidation into one or more tanks along with re-sampling of the consolidated sludge. This would likely not occur until Fiscal Year 2004.

4.3 Alternatives

The three technologies being considered and the alternatives associated with each are summarized below.

1. Vitrification
   a. Alternative 1.a – In situ vitrification with disposal of the primary and secondary waste streams at the ICDF
   b. Alternative 1.b – On-INEEL ex situ vitrification with disposal of the primary and secondary waste streams at the ICDF
2. Thermal Desorption
   a. Alternative 2.a - On-INEEL thermal desorption with off-INEEL treatment of the secondary waste streams and disposal of stabilized residue at the ICDF
   b. Alternative 2.b - On-INEEL thermal desorption with on-INEEL treatment of the secondary waste and disposal of stabilized residue at the ICDF
   c. Alternative 2.c - On-INEEL thermal desorption with off-INEEL treatment of the secondary waste streams and disposal of stabilized residue off-INEEL
3. Chemical Oxidation and Stabilization
   a. Alternative 3.a – In situ chemical oxidation and stabilization with disposal of primary and secondary waste streams at the ICDF
   b. Alternative 3.b – Ex situ chemical oxidation and stabilization with disposal of primary and secondary waste streams at the ICDF

These technologies have been selected and agreed upon by DOE (Hain 2002). The seven alternatives, discussed in more detail below, may change as data are collected during the evaluation process.

For each of the alternatives discussed below, it is assumed that a portion of the liquid (6,000 gal from V-3) is decanted, treated, stabilized, and disposed of at the INEEL (ICDF) as part of the early remedial actions. As mentioned above, other treatment and disposal options are being considered, but this is the baseline assumption. Consequently, the material to be treated by each alternative will consist of a combination of liquid and sludge as follows (refer to Table 1):

- V-1: 520 gal of sludge, plus 1,164 gal of liquid
- V-2: 520 gal of sludge, plus 1,076 gal of liquid
- V-3: 652 gal of sludge, plus 1,648 gal of liquid
- V-9: 250 gal of sludge, plus 70 gal of liquid.

4.3.1 Alternative 1.a – In Situ Vitrification with Disposal of the Primary and Secondary Waste Streams at the ICDF

A simplified process flow diagram of Alternative 1.a is shown in Figure 3. This process involves deployment of an in situ vitrification system, complete with the associated off-gas cleanup system. The type of melt that would be conducted is referred to as a planar melt, where the melt takes place at the level of the V-tanks (10 to 20 ft below grade). Before beginning the melt, soil (and possibly other absorbent fill material) would be added to the tanks. Existing tank lines and portals would be used to the extent possible and additional vent lines added as necessary to direct and capture most of the off-gases and preclude pressure buildup. A large hood would be placed over the area to capture additional fumes, and all of the off-gas would be treated through various wet (or dry) scrubber systems and filters before being discharged. Typically, secondary waste scrubber solutions are generated and must be treated and disposed of at the ICDF. The vendor would identify the exact unit operations required for the off-gas system and the associated stream compositions.

For all of the technologies identified, current plans call for clean closure of the tank system. For in situ vitrification, the resulting melt would be sized and placed in appropriate containers for disposal at the ICDF. Surrounding soil would be sampled and disposed of accordingly. Clean soil would be used to backfill the AOC. The exact number of melts would be established by the vendor selected but could range from one melt if all of the sludge is first consolidated into one tank or up to four melts if each tank is treated separately. In addition, other waste material (for example, piping) could potentially be incorporated into the melt.

In the event removal of the melt and disposal at the ICDF proves impractical (because of high cost/exposure, for example), it may become necessary to consider leaving the melt in place with an appropriate cap and the associated monitoring. This alternative was evaluated previously in the feasibility study, but no attempt will be made at this stage of the evaluation process to evaluate this alternative unless the removal option is shown to be unworkable.

4.3.2 Alternative 1.b – On-INEEL Ex Situ Vitrification with Disposal of the Primary and Secondary Waste Streams at the ICDF

Figure 4 provides the process diagram for this alternative. With this alternative, the tank contents would be removed and transferred into an adjacent external vitrification unit. Soil from the area would be added concurrently with tank contents to provide the proper mix. The unit would include an off-gas cleanup system comparable to the one required for in situ vitrification and produce comparable waste streams for disposal at the ICDF. The melt would be conducted in a container that would likely be directly disposed of at the ICDF. The vendor would determine the exact number of melts.

To the extent possible, other wastes such as piping and soil would be incorporated into each melt. The tanks and other contaminated soil would then be removed and disposed of at the ICDF. Finally, the AOC would be backfilled and clean closed.

The ex situ vitrification process is expected to perform in a manner such that the transuranic content of the vitrified waste will meet the ICDF waste acceptance criteria (<10 nCi/g). If the transuranic content does not meet the criteria, disposal of the waste off-INEEL may be possible. These off-INEEL facilities, discussed in more detail under Alternative 2.c (Section 4.3.5), are not currently accepting hazardous out-of-state waste, requiring either interim storage on-INEEL or de-listing. Therefore, off-INEEL disposal associated with ex situ vitrification will not be pursued at this time unless subsequent data indicate otherwise.

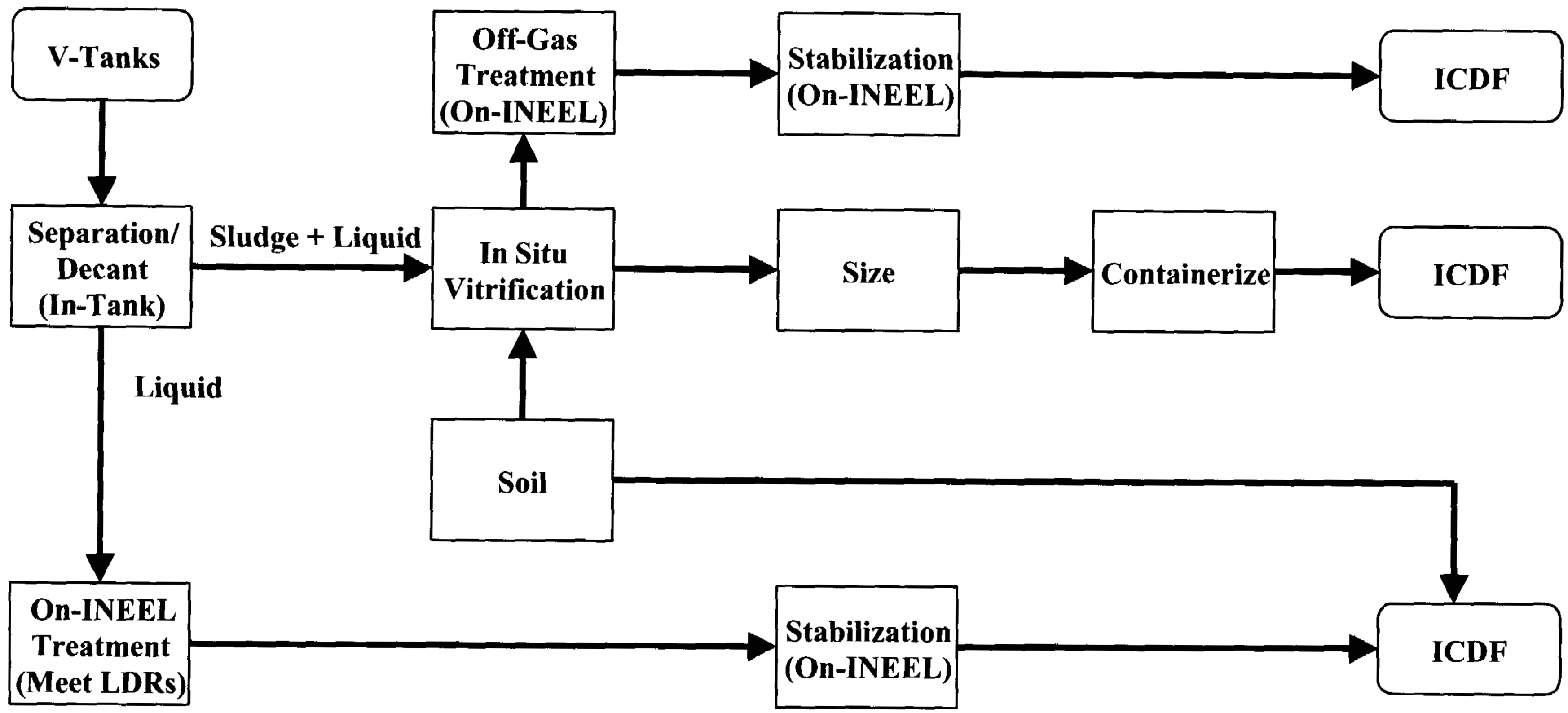


Figure 3. Alternative 1.a – in situ vitrification process flow diagram.

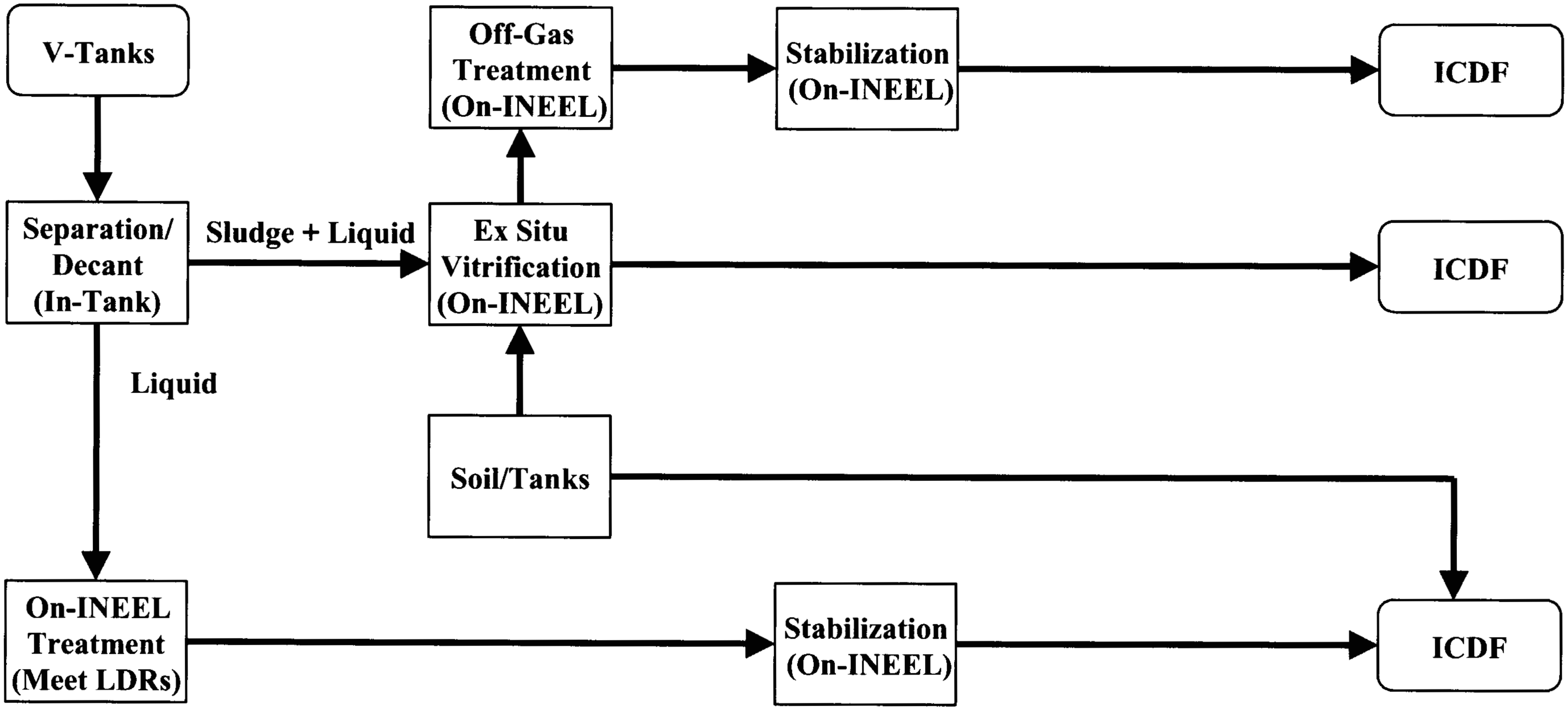


Figure 4. Alternative 1.b – ex situ vitrification process flow diagram.

4.3.3 Alternative 2.a - On-INEEL Thermal Desorption with Off-INEEL Treatment of the Secondary Waste Streams and Disposal of Stabilized Residue at the ICDF

A diagram of this process is provided in Figure 5. Under this alternative, V-tank contents would be transferred to the thermal desorption unit used to separate inorganics from organics and other low-boiling-point constituents such as water. Due to the temperature required to vaporize the PCBs, approximately 400°C, the mercury would also reach the overheads. Not unlike the vitrification process, a relatively sophisticated off-gas system would be used to collect and treat the off-gas. Expected by-products include water, organics, and mercury. For this alternative, it is assumed that these slightly radioactive mixed wastes, either as miscible or non-miscible phases, would be containerized and shipped off-INEEL for treatment and disposal. Since thermal desorption only achieves separation, additional treatments are required to destroy organic constituents such as PCBs and amalgamate the mercury (as required). The inorganic residue from the thermal desorption unit will contain most of the heavy metals and radionuclides. This material will be stabilized (grouted) and disposed of at the ICDF. Likewise, the tanks and soil would be disposed of at the ICDF.

4.3.4 Alternative 2.b - On-INEEL Thermal Desorption with On-INEEL Treatment of the Secondary Waste Streams and Disposal of Stabilized Residue at the ICDF

Figure 6 is a process flow diagram for this alternative. This alternative is identical to Alternative 2.a, except the secondary waste streams are treated on-INEEL. Based on the conceptual design studies, the exact treatment process for this waste stream will be determined. This process could include thermal and non-thermal means of destroying the organics.

4.3.5 Alternative 2.c - On-INEEL Thermal Desorption with Off-INEEL Treatment of the Secondary Waste Streams and Disposal of Stabilized Residue Off-INEEL

A process flow diagram of this alternative is shown in Figure 7. This alternative affords the opportunity to dispose of the tank contents and associated secondary waste streams off-INEEL, as opposed to Alternative 2.b where all the waste is treated and disposed of on-INEEL. In this case, rather than disposing of the inorganic residue at the ICDF, the residue would be disposed of at an off-INEEL disposal facility, such as the Nevada Test Site, Hanford, or perhaps even the Waste Isolation Pilot Plant. Currently, the Nevada Test Site and Hanford are accepting mixed wastes from within their respective states and are pursuing the capability to receive out-of-state wastes. Since these sites are not currently authorized to accept V-tank waste, it is assumed that the waste would be stored on-INEEL until authorization is granted. (Another option is to de-list the waste following treatment.) If the inorganic waste form from the thermal desorption unit exceeds 100 nCi/g transuranic, it may be possible to dispose of the waste as remote-handled waste at the Waste Isolation Pilot Plant without grouting. As with the other off-INEEL disposal options, interim storage would be required until shipments could be arranged. The secondary off-gas waste streams would be treated and disposed of off-INEEL (as in Alternative 2.a), and the tanks and soil would be sent to the ICDF for disposal.

4.3.6 Alternative 3.a - In-Situ Chemical Oxidation and Stabilization with Disposal of Primary and Secondary Waste Streams at the ICDF

Figure 8 is a process flow diagram of this alternative. For this alternative, it is assumed that all of the sludge is transferred to one of the three 10,000-gal stainless-steel V-tanks. Chemicals (typically a catalyst and an oxidant/reductant) would be added and thoroughly mixed with the tank contents to ensure sufficient destruction of the organics, including the PCBs. Since in situ heating may be somewhat difficult to achieve, it will be employed only as necessary to ensure adequate organic destruction. Once adequate destruction efficiency is achieved, the pH would be checked and adjusted as necessary to ensure adequate

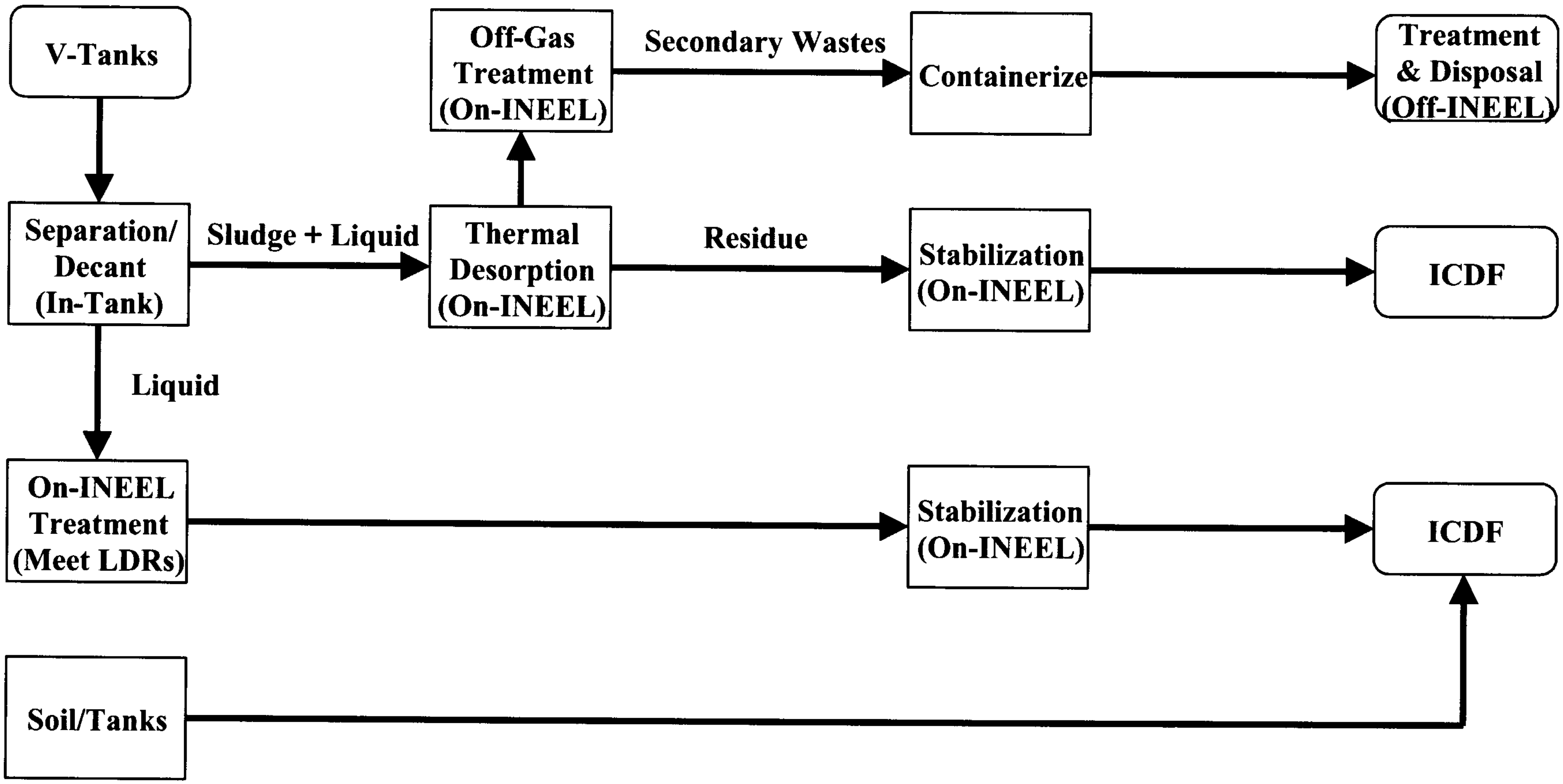


Figure 5. Alternative 2.a – thermal desorption and stabilization process flow diagram.

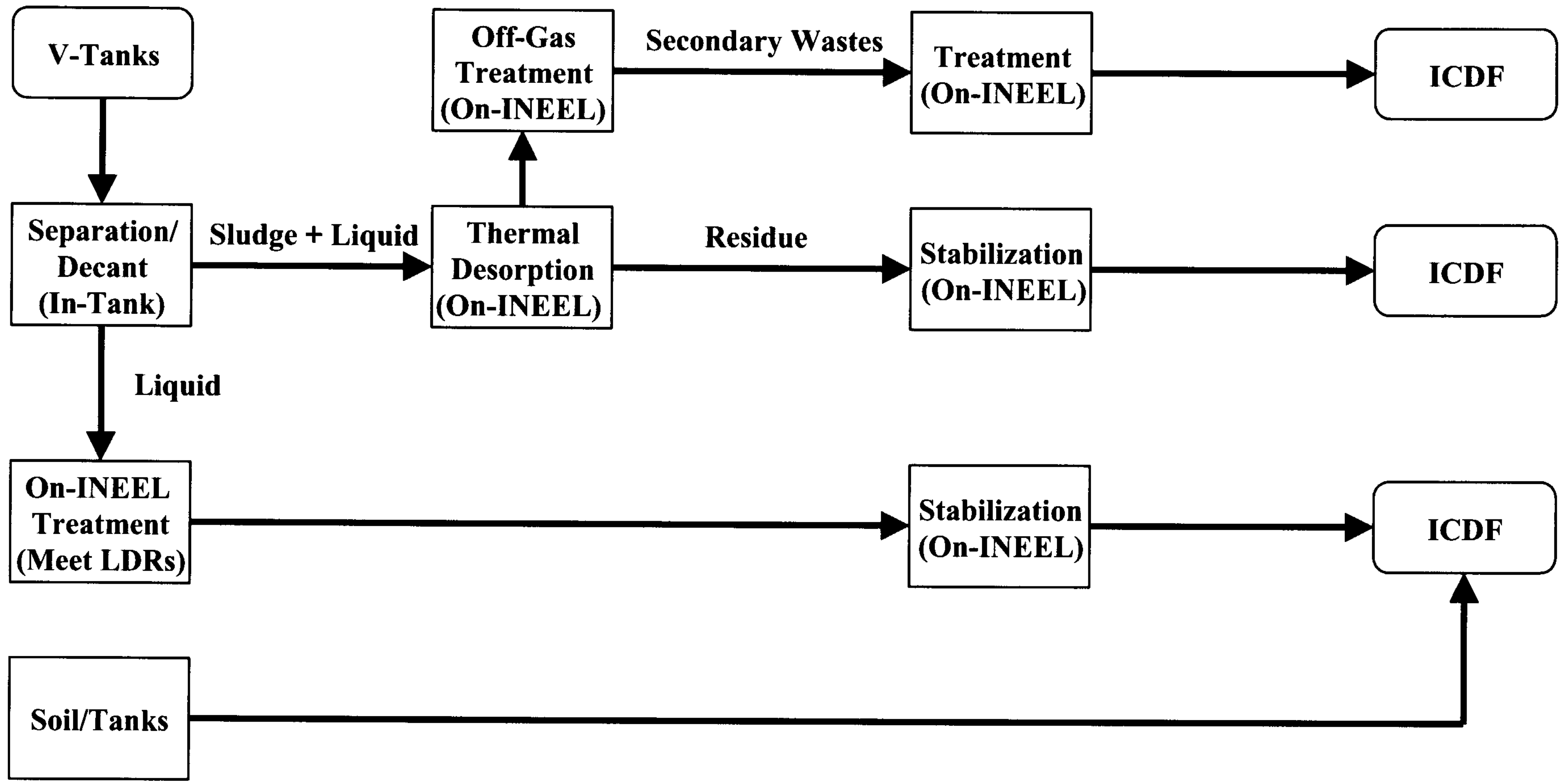


Figure 6. Alternative 2.b – thermal desorption and stabilization process flow diagram.

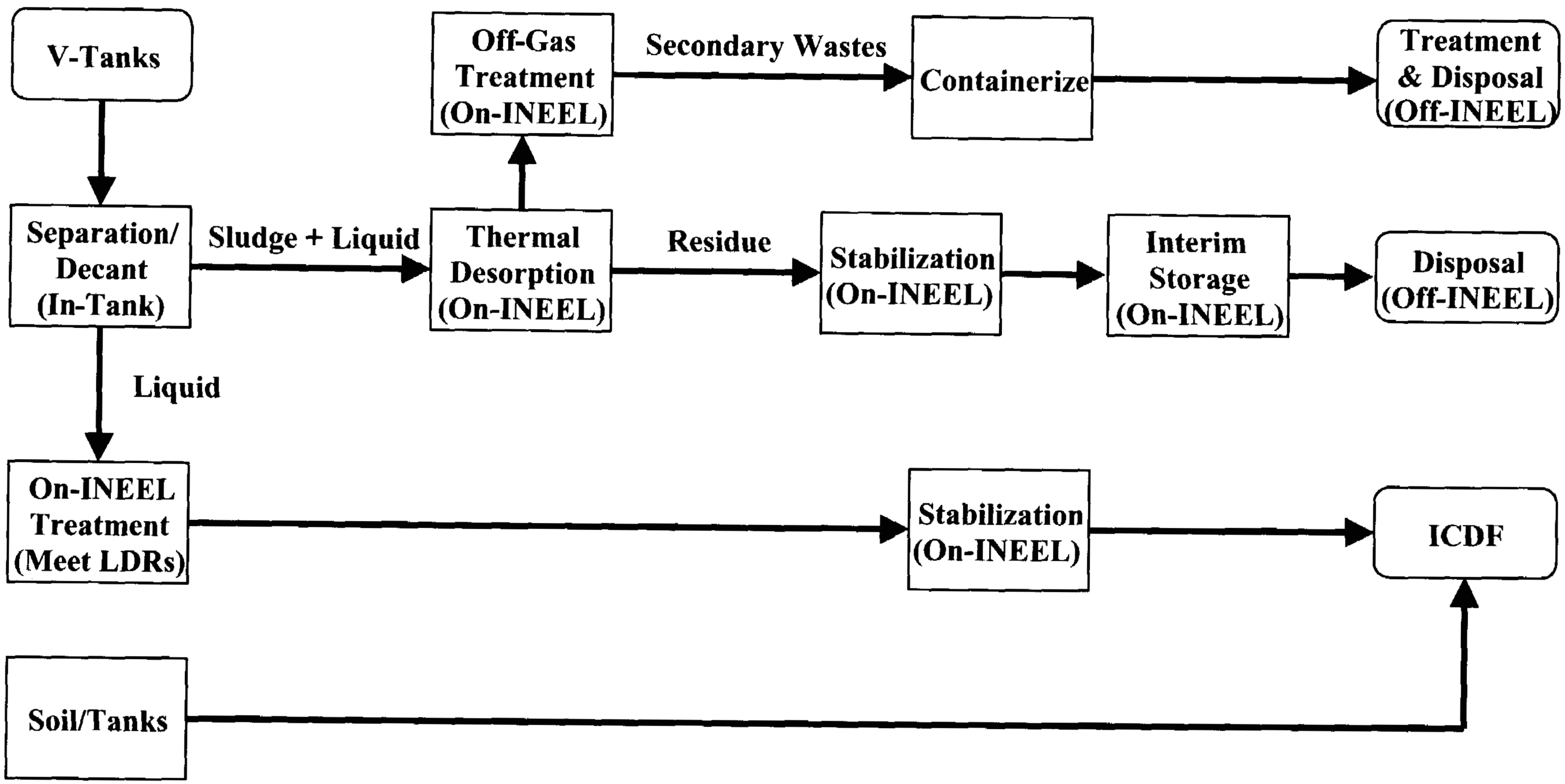


Figure 7. Alternative 2.c – thermal desorption and stabilization process flow diagram.

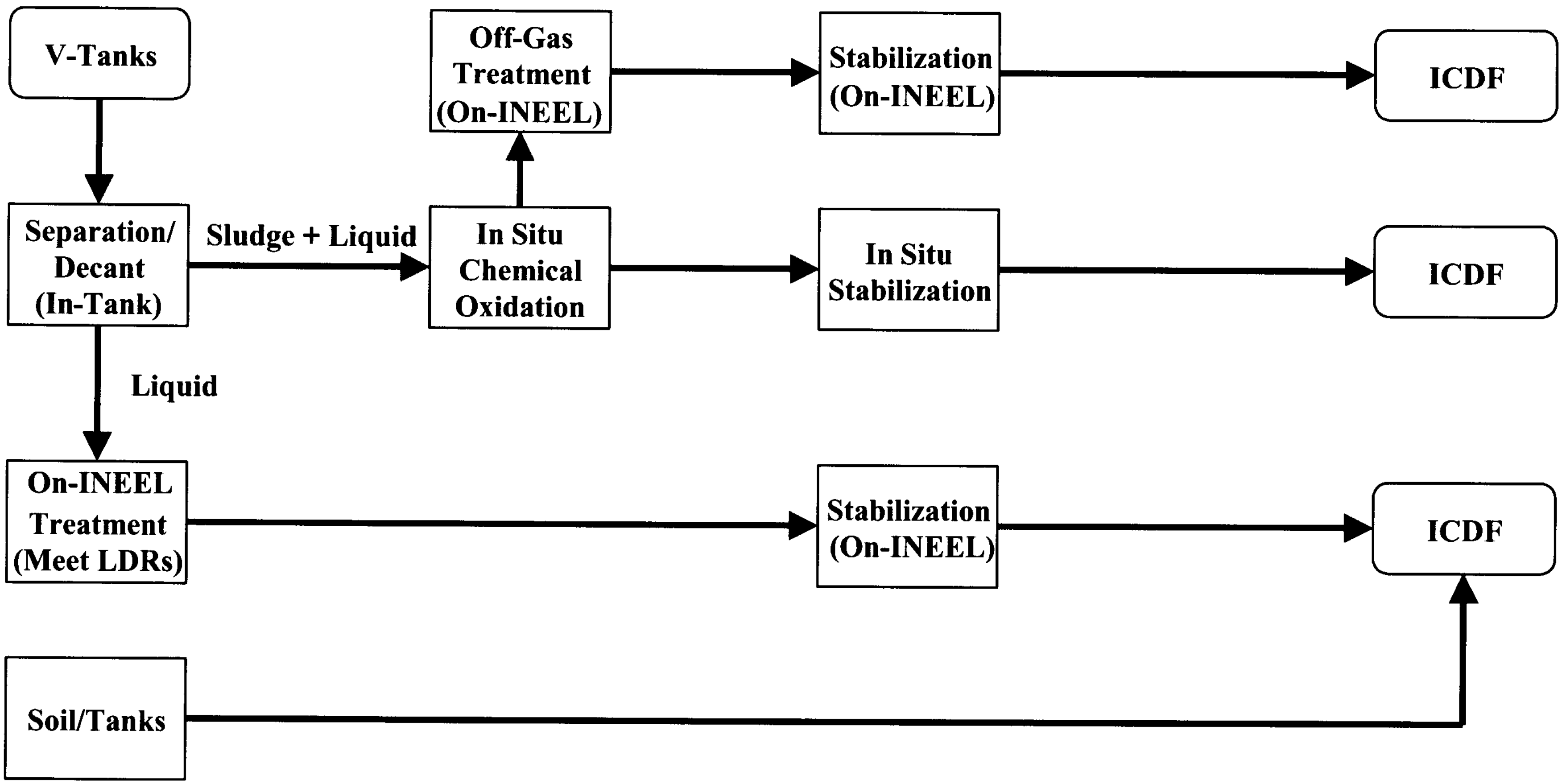


Figure 8. Alternative 3.a – in situ chemical oxidation and stabilization process flow diagram.

oxidation of the mercury. Then the waste would be neutralized before stabilization. To ensure adequate mixing of the grout and sludge, the waste may be removed and mixed with the grout ex situ for placement back into each of the four tanks. (The exact approach to be used would be established during the design process.) The tanks would then be removed and disposed of at the ICDF.

A simple off-gas system would be used to capture any water or VOCs that are evaporated during the exothermic oxidation step. The waste liquid would be filtered and disposed of at the ICDF (or another TSDF).

4.3.7 Alternative 3.b – Ex Situ Chemical Oxidation and Stabilization with Disposal of Primary and Secondary Waste Streams at the ICDF

This alternative, shown in Figure 9, is identical to Alternative 3.a, except the treatment would be done ex situ. In this case, the waste would be transferred to a stirred reaction tank, where the chemicals would be added. Depending on the chemicals selected, the vessel may be heated to as high as 100°C to facilitate the organic destruction. Consequently, a slightly more complicated off-gas system may be required than would be needed for in situ treatment. Acid adjustments would be made as required to ensure proper stabilization of the metals. Then the material would be transferred and stabilized in containers, followed by transport to and disposal at the ICDF.

4.4 Alternatives Not Evaluated

The alternatives selected above for further consideration were down-selected from several potential alternatives. Previous studies and evaluations were used extensively to determine viable alternatives for treatment of V-tank waste. Five of the key references and their conclusions are summarized below.

4.4.1 V-Tanks Feasibility Study

The V-tanks feasibility study (DOE-ID 1997) narrowed the technologies down to (a) off-INEEL treatment, (b) in-situ vitrification, and (b) grouting. Other alternatives were considered but dismissed. Of these, off-INEEL treatment is no longer available/viable for treatment of the sludge, and grouting alone failed to comply with ARARs. In situ vitrification remains a viable alternative.

4.4.2 Alternatives to Incineration

A report commissioned by the Secretary of Energy (DOE 2000) evaluated alternatives to incineration for treatment of PCB-contaminated transuranic waste. The panel made three divisions relative to technology maturity and deployability:

- Technologies that clearly appear promising and should have the highest priority for funding – steam reforming, thermal/vacuum desorption, DC-arc melter, and plasma torch
- Potentially promising technologies for which important unresolved issues remain – mediated electrochemical oxidation, microwave decomposition, supercritical water oxidation, and solvated electron dehalogenation
- Technologies to which the panel accords lowest priority – iron-chloride catalyzed oxidation, molten aluminum, solvent extraction, high-temperature hyperbaric chamber, silent-discharge plasma, soil washing with a chelating agent, treatment with sodium in mineral oil followed by chemical oxidation with peroxydisulfate, and biological treatment.

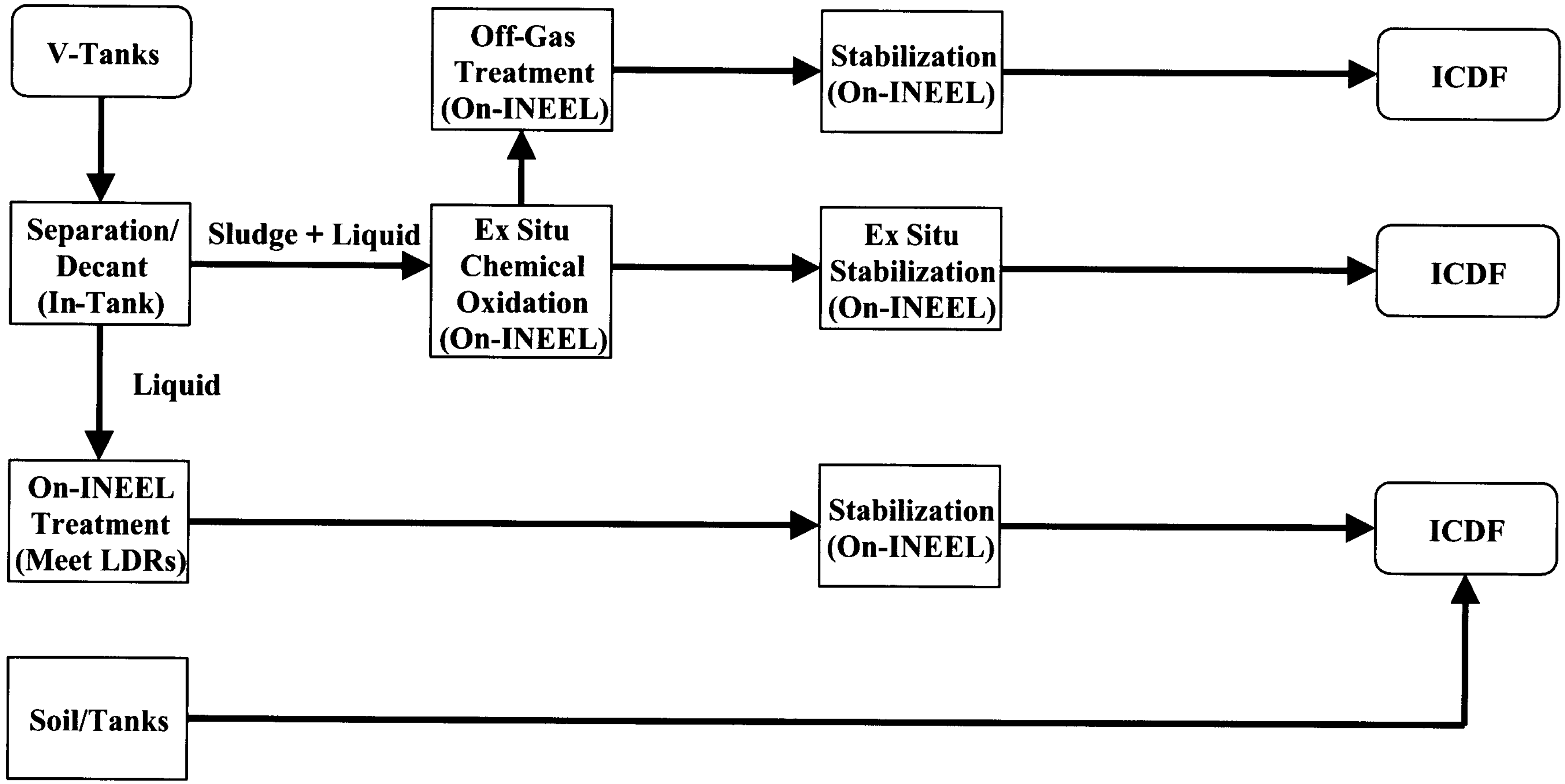


Figure 9. Alternative 3.b – ex situ chemical oxidation and stabilization process flow diagram.

It is important to note that the top choices were all thermal treatments. Furthermore, although the waste streams have similar constituents, the report was based on treatment of a solid material versus the aqueous sludge in the V-tanks. So while chemical-oxidation-type processes did not find favor with the panel, the primary reason was attributed to the initial waste form.

Steam reforming was not selected for further evaluation for two primary reasons: (1) timely deployment and (2) process compatibility. A steam reformer may be deployed at INTEC (primarily for processing sodium-bearing waste) or at the INEEL's Radioactive Waste Management Complex (for processing contact-handled transuranic solid waste). These processes are not yet approved, and significant modifications would be required to handle the V-tank waste.

The DC-arc melter and plasma torch are essentially variants to the selected vitrification technology.

4.4.3 K-Basin Sludge PCB Removal Technology Assessment

Much like the aforementioned report, a technology assessment on K-basin sludge (Ashworth 1998) evaluated a comparable set (14 total) of potential technologies. Similar conclusions were drawn. There are new technologies that have good potential but require further development, while others have not been proven in a radiological environment where high pressures might cause safety/contamination concerns. The conclusion from the report was that direct chemical oxidation is more fitted to removal/destruction of PCBs from the sludge. In this case, the concentration of PCBs was lower, and some of the bothersome heavy metals such as mercury were not a major concern. The waste stream is an aqueous-based sludge, comparable to the V-tank waste.

4.4.4 EPA Treatment Technologies Screening Matrix

An EPA treatment-screening matrix (EPA 2002) was also reviewed. Due to the complexity of the V-tank waste stream, it must be recognized that multiple treatment technologies must generally be employed. This review yielded a similar down-select. The only other viable alternative from the matrix that did not make the short list was incineration, which remains an option for off-INEEL treatment of the organic waste stream produced during thermal desorption but was ruled out as an on-INEEL option due to recent shutdown of the incinerator at the INEEL's Waste Experimental Reduction Facility and the public response to the proposed incinerator at the INEEL's Advanced Mixed Waste Treatment Facility. No off-INEEL incinerators are available/permitted to treat the Class B radioactive V-tank sludge directly.

4.4.5 Transuranic and Mixed-Waste Focus Area

The Transuranic and Mixed-Waste Focus Area (TMFA) is a national DOE program that is resident at the INEEL. TMFA personnel have been actively involved with the V-Tank Project and concur with the down-select. The goal of this program is to identify and deploy technologies for treatment of some of the DOE's most challenging waste streams. TMFA personnel recommended evaluation of a grout-only option. This option was dismissed in the proposed plan and ROD because of failure to comply with ARARs. Although grouts have progressed since 1999, the LDR limits are based on total organic concentration, not the TCLP. Without pre-treatment of the organics (for example, PCBs), the total concentration significantly exceeds the LDR limits (for example, 10 ppm PCB). Utilization of this option would require a treatability variance to address the reduction in leachability versus the requirement based on total concentration. Although further discussion with TMFA personnel will continue, the grout-only option will not be considered at this time.

Therefore, based on review of these documents and other consultations, the only alternatives that appear to be rapidly deployable and capable of sufficiently treating the V-tank waste are (a) vitrification, (b) thermal desorption and stabilization, and (c) chemical oxidation and stabilization.

5. DATA NEEDS

The technology evaluation process outlined in Section 2 is designed to obtain the data necessary to allow a thorough evaluation of the alternatives relative to the CERCLA criteria. To ensure all of the necessary data are collected, thus allowing an informed decision with reduced downstream implementation issues, a matrix of known and yet-to-be-determined data needs will be developed and used to guide the technology evaluation process. Specific data needs are listed below along with the planned approach for collecting the necessary information. In addition, the vendors selected to provide information on their respective technology will be asked to provide their input relative to these criteria to ensure the requisite data are obtained. The specific data needs are as follows:

- Protection of Human Health and the Environment – To ensure environmental, safety, and health concerns are addressed, a preliminary safety analysis review of the various technologies will be conducted. This review will identify the major system risks and potential controls necessary to mitigate them. Although this is a threshold criterion, the ability to implement these controls and their short-term effectiveness will also be assessed.

- Compliance with ARARs – A preliminary review of the ARARs is under way. The remedy shall identify all technology-specific ARARs as well as any required exceptions, waivers, or variances. These will be identified and noted in the technology evaluation report. It will also be necessary to re-evaluate the data on the sludge and liquid in light of how the material will now be treated.

- Long-Term Effectiveness and Permanence – Information on the relative stability of the final waste forms will be obtained from the vendors and existing technical information. Note that each of the planned alternatives achieves clean closure of the V-tank site. Therefore, the impact of this criterion will reside at the applicable TSDFs, some of which are on-INEEL while others are off-INEEL. Comparison of the waste form generated from the treatment process will be evaluated against the performance assessment of each disposal site to establish relative long-term effectiveness.

- Reduction of Toxicity, Mobility, or Volume Through Treatment – Each of the vendors will be required to develop a process flow diagram, provide the associated material balances, and identify the TSDF where the waste stream will be dispositioned. Such data will ensure a complete assessment of this criterion.

- Short-Term Effectiveness – In part, this criterion will be addressed by the safety analysis mentioned above. Furthermore, vendors will be asked to ensure they can meet the overall schedule established by the V-Tank Project.

- Cost – A life-cycle cost estimate will be prepared by the BBWI cost-estimating organization. Past data from estimates on the V-tanks and similar projects will be used as input to the extent possible. This includes costs for preparation of the associated documentation, such as the proposed plan, ROD amendment, and RD/RA work plan. Previous estimates for soil and tank removal will be used as well as liquid removal and treatment. Cost for design, deployment, and operation of the treatment process will be obtained primarily through vendors' requests for information. To ensure all the necessary life-cycle costs are captured, the cost estimators will prepare a spreadsheet to identify the data needs.

- State/Support Agency Acceptance – Input from the Agencies—for example, the approval for any necessary treatment waivers or variances—will be sought. In addition, other technical and regulatory input from the Agencies will be solicited and incorporated into the final analysis and selection.

- Community Acceptance – The majority of public input will come during review of the proposed plan. However, due to the delay and redirection of the V-Tank Project, a preliminary fact sheet will be issued identifying the selected technologies and allowing public feedback. This will provide the project and Agencies an early indication of potential issues and questions likely to be raised during the formal public comment period.

By ensuring the data needs remain focused relative to the evaluation criteria, the project is assured the requisite information will be collected, thus allowing for a well-documented selection of the preferred alternative.

It is important to note that the information and data that will be collected will be based on previous sample results, some of which have considerable variation. Due to this variability, it may be necessary to obtain additional samples prior to actual treatment. The need for this will be determined after selection of a preferred alternative.

One additional step is being taken to ensure the data needs are fulfilled at the time the preferred alternative is selected. Experts within BBWI on alternatives analysis will be consulted. Their review of data needs early in the process will ensure that no data gaps arise later and that implementation issues are minimized.

Plans are to use technology screening/modeling tools to facilitate selection of the preferred alternative (see Chambers and Richardson 2000, for example). This may include such things as quantitative weighting factors for the various criteria. These types of tools not only provide input to the decision-makers, but they help ensure an objective evaluation of the alternatives is performed. Sensitivity analyses will be performed to determine the impact that different weighting factors have on the final selection.

6. TECHNOLOGY EVALUATION REPORT

6.1 Purpose

At the conclusion of the technology evaluation, the results will be summarized and documented in a technology evaluation report. That report will be prepared as a secondary document with a 30-calendar-day Agency review period.

6.2 Outline

The technology evaluation report will follow the established format of a feasibility study but will also include the selection of a preferred alternative. The major sections will be as follows:

- Introduction – In this section, assumptions, remedial action objectives, potentially applicable ARARs, and general response actions will be addressed.
- Identification and Screening of Technologies – Key elements of this section will include a technical evaluation of potential alternatives and an outline of applicable screening criteria.
- Development of Alternatives – Specific alternatives will be provided in this section, along with a brief description of each.
- Detailed Analysis of Alternatives – This section will provide a summary of the data collected on each alternative and will evaluate them relative to the established CERCLA criteria.
- Selection of Preferred Alternative – In this section, the results of the decision-modeling and evaluation process will be presented, and a preferred alternative will be identified.
- Schedule and Deliverables – This section will provide an updated working schedule and deliverables table for the preliminary design study.

7. SCHEDULE, DELIVERABLES, AND COST

7.1 Schedule

A working schedule outlining the major tasks and activities associated with the technology evaluation process is provided in Figure 10. The schedule includes only those activities associated with the V-Tank Project up through the ROD amendment, recognizing that other OU 1-10 activities are scheduled during the same period. In addition, the schedule provided for the preliminary design study is considered preliminary and will be updated and confirmed as a working schedule in the technology evaluation report.

7.2 Deliverables

Key deliverables based on the planned scope and schedule are provided in Table 4.

Table 4. Deliverables for V-tanks technology evaluation and early remedial action.

Deliverable	Planned Submittal Date	Enforceable Submittal Date	Agency Review Duration in Days	Document Type
V-Tanks Technology Evaluation Report				
V-Tanks Technology Evaluation Scope of Work	5-24-02	NA	15	Expedited Secondary
V-Tanks Technology Evaluation Fact Sheet	6-14-02	NA	7	Informal
V-Tanks Technology Evaluation Report	10-25-02	NA	30	Secondary
V-Tanks Early Remedial Action				
Early Remedial Action Design Study	9-11-02	NA	7	Informal
V-Tanks Soil Field Sampling Plan	11-12-02	NA	30	Secondary
Explanation of Significant Differences for Early Remedial Action Activities	12-9-02	NA	15	Other
V-Tanks RD/RA Work Plan Addendum for Early Remedial Action Activities	1-21-03	NA	30	Secondary
V-Tanks Proposed Plan and ROD Amendment				
Draft Proposed Plan[a]	1-03	NA	30	Secondary
Draft ROD Amendment	8-03	TBD	45	Primary
Draft V-Tanks RD/RA Scope of Work	1-04	NA	30	Other
V-Tanks Remedial Design	Schedule and milestones for the following deliverables to be set in the V-tanks technology evaluation report or the RD/RA scope of work.			
Draft Preliminary Design Study Work Plan	TBD	NA	30	Secondary
Draft Preliminary Design Study Report	TBD	NA	30	Secondary
Draft V-Tanks RD/RA Work Plan	TBD	TBD	45	Primary

a. A preliminary draft ROD amendment will be provided with the draft proposed plan for an informal Agency review.

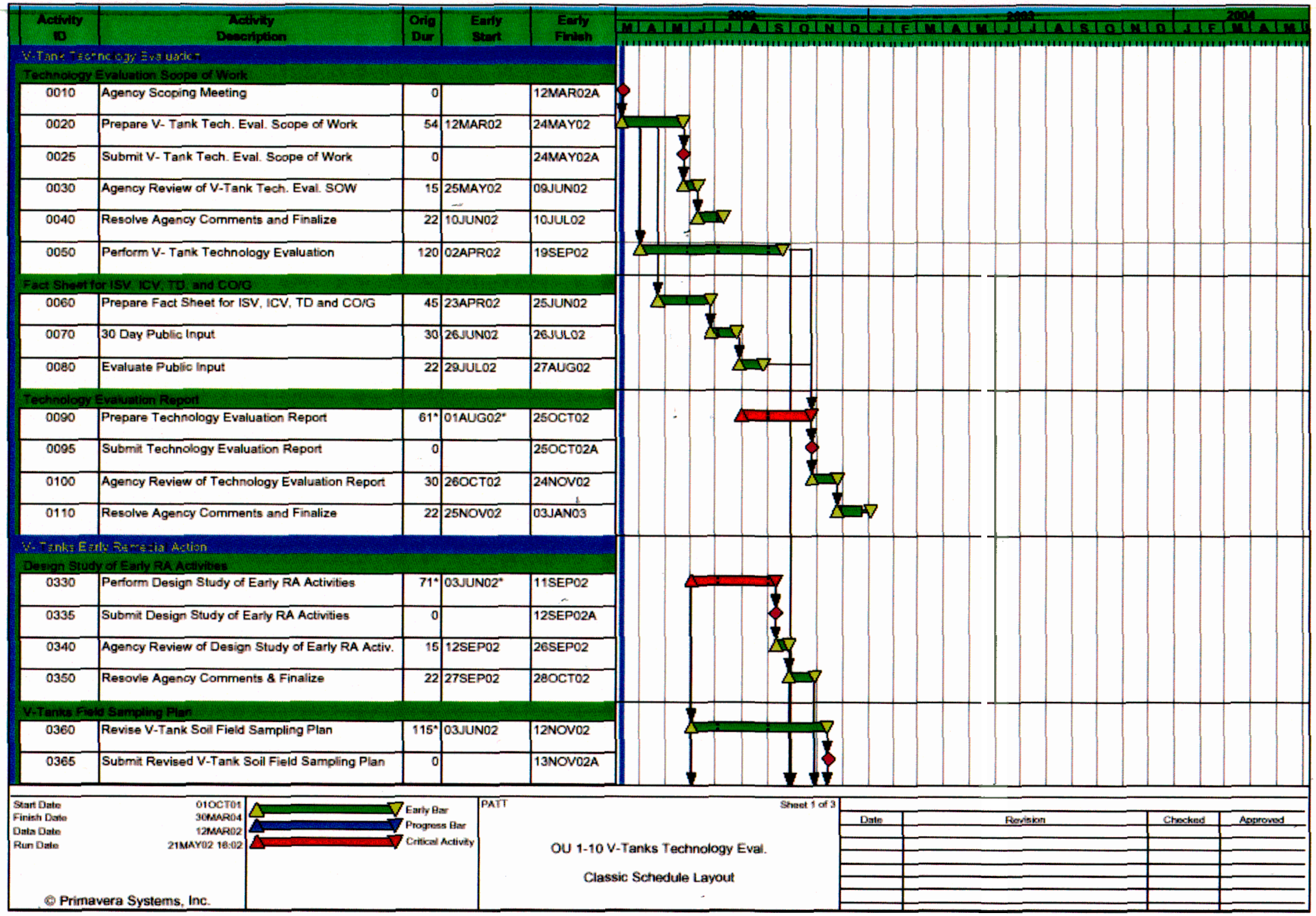
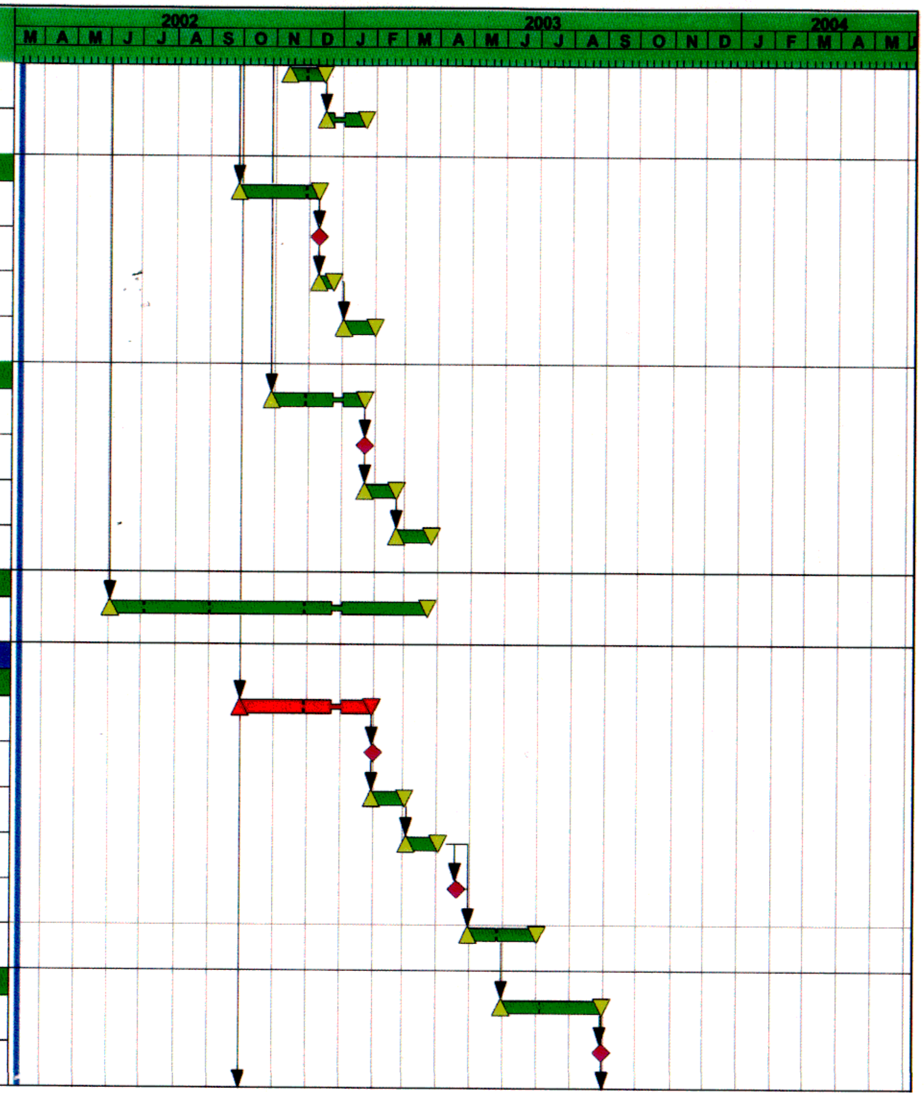


Figure 10. Schedule of technology evaluation activities for the V-Tank Project (Page 1 of 3).

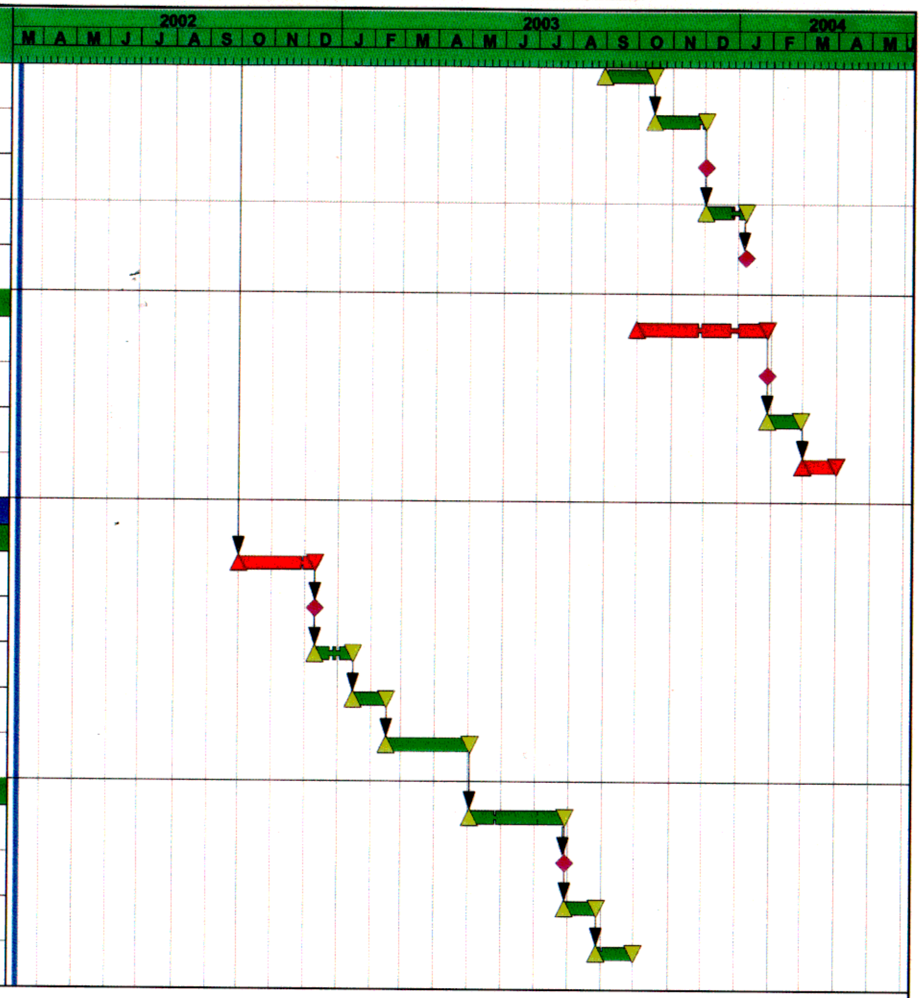
Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
0370	Agency Review of Revised Field Sampling Plan	30	13NOV02	14DEC02
0380	Resolve Agency Comments & Finalize	22	16DEC02	22JAN03
ESD for Early RA Activities				
0390	Prep. Expl. of Sig. Dif. for Early RA Activities	50*	27SEP02	09DEC02
0395	Submit ESD for Early RA Activities	0		10DEC02A
0400	Agency Review of ESD for Early RA Activities	15	10DEC02	24DEC02
0410	Resolve Agency Comments & Finalize	22	02JAN03	31JAN03
V-TanksRD/ RAWP Adden. for Early RA Actv				
0420	Prep. V-Tanks RD/RAWP Addendum for Early RA Act	53*	29OCT02	21JAN03
0425	Submit Proposed Plan and Prelim. ROD Ammendment	0		22JAN03A
0430	Submit RD/RAWP Addendum for Agency Review	30	22JAN03	20FEB03
0440	Resolve Agency Comments & Finalize	22	21FEB03	24MAR03
V-Tanks SAR / TSR Rev. for Early RA Activities				
0450	SAR / TSAR Revision for V-Tanks Content Removal	200	03JUN02	21MAR03
V-Tanks Proposed Plan & ROD Ammendment				
Proposed Plan and Prelim Dft ROD Ammend.				
0120	Prepare Proposed Plan and Prelim. Draft ROD Amm.	80	01OCT02*	30JAN03
0125	Submit Proposed Plan and Prelim. Draft ROD Ammen	0		31JAN03A
0130	Agency Review of Proposed Plan & Prelim. ROD Amm	30	31JAN03	01MAR03
0140	Resolve Agency Comments & Finalize	22	03MAR03	01APR03
0150	Notify Public of 30 day Proposed Plan Review	0		17APR03A
0160	Proposed Plan Public Review	43	30APR03	30JUN03
Draft ROD Ammendment				
0170	Prepare Draft ROD Ammendment/Responsivness Sum.	65	30MAY03	29AUG03
0175	Submit Draft ROD Ammendment	0		29AUG03A



Start Date 01OCT01 Finish Date 30MAR04 Data Date 12MAR02 Run Date 21MAY02 16:02 © Primavera Systems, Inc.	Early Bar Progress Bar Critical Activity	PATT Sheet 2 of 3 OU 1-10 V-Tanks Technology Eval. Classic Schedule Layout	Date / Revision / Checked / Approved

Figure 10. (continued) (Page 2 of 3).

Activity ID	Activity Description	Orig Dur	Early Start	Early Finish
0190	45 day Agency Review of Draft ROD Ammendment	45	30AUG03	14OCT03
0200	45 day Comment Resolution and Incorporation	33	15OCT03	02DEC03
0205	Submit Final Draft ROD Ammendment	0		01DEC03A
0210	Agency Concur & ROD Ammendment Finalization	30	03DEC03	07JAN04
0220	ROD Ammendment Goes Final	0		07JAN04
V-Tanks RD/RA Scope of Work				
0230	Prepare V Tanks RD/RA Scope of Work	78	01OCT03*	28JAN04
0235	Submit V-Tanks RD/ RA Scope of Work	0		28JAN04A
0240	Agency Review of V-Tank RA/RD SOW	30	29JAN04	27FEB04
0250	Resolve Agency Comments & Finalize	22	01MAR04	30MAR04
V-Tanks Preliminary Design Study				
V-Tanks Preliminary Design Study Work Plan				
0260	Prepare Preliminary Design Study Work Plan	48	01OCT02*	09DEC02
0265	Submit Preliminary Design Study Work Plan	0		10DEC02A
0270	Agency Review of Preliminary Design Study	30	10DEC02	14JAN03
0280	Resolve Agency Comments & Finalize	22	15JAN03	13FEB03
0290	Conduct Preliminary Design Study	55	14FEB03	01MAY03
V-Tanks Preliminary Design Study Report				
0300	Prepare Preliminary Design Study Report	60	02MAY03	28JUL03
0305	Submit Preliminary Design Study Report	0		28JUL03A
0310	Agency Review of Prelim. Design Study Report	30	29JUL03	27AUG03
0320	Resolve Agency Comments & Finalize	22	28AUG03	29SEP03



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Run Date	21MAY02 16:02

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Sheet 3 of 3

OU 1-10 V-Tanks Technology Eval.

Classic Schedule Layout

Date	Revision	Checked	Approved

Figure 10. (continued) (Page 3 of 3).

7.3 Costs

Costs for the major activities and the total cost for work scope related to technology evaluation through the ROD amendment are provided in Table 5.

Table 5. Estimated cost.

	FY 2002	FY 2003	FY 2004	Cumulative
Technology Evaluation				
V-Tanks Technology Evaluation Scope of Work and Preliminary Activities	156,150	0	0	156,150
V-Tanks Remedial Technology Vendor Down-Selection Process	18,955	0	0	18,955
Chemical Oxidation/Grouting Technology Evaluation	68,121	0	0	68,121
Ex Situ Vitrification Technology Evaluation	47,945	0	0	47,945
Thermal Desorption Technology Evaluation	48,175	0	0	48,175
In Situ Vitrification Technology Evaluation	48,339	0	0	48,339
Prepare V-Tanks Remedial Technology Fact Sheet	15,176	0	0	15,176
V-Tanks Technology Evaluation Report	74,316	21,791	0	96,107
Subtotals	477,177	21,791	0	498,968
Early Remedial Action Design				
Design Study Engineering Design File for Early Remedial Actions	97,634	9,689	0	107,323
Process Equipment Waste (PEW) Processing Proposal	60,501	0	0	60,501
Safety Analysis Report/Technical Safety Requirement Revision for Early Remedial Actions	68,660	21,340	0	90,000
Soil Field Sampling Plan for Early Remedial Actions	51,349	49,969	0	101,318
Explanation of Significant Differences for Early Remedial Actions	0	72,057	0	72,057
Prepare RD/RA Work Plan Addendum for Early Remedial Actions	0	150,477	0	150,477
V-Tank "Water" PEW Process Development	0	33,385	0	33,385
Subtotals	278,144	336,917	0	615,061
Proposed Plan and ROD Amendment				
V-Tank Proposed Plan and Preliminary Draft ROD Amendment	0	92,790	23,696	116,486
Draft ROD Amendment Responsiveness Summary	0	0	14,825	14,825
ROD Amendment Finalization	0	0	22,247	22,247
Subtotals	0	92,790	60,768	153,558

Table 5. (continued).

	FY 2002	FY 2003	FY 2004	Cumulative
Preliminary Design Study				
Preliminary Design Study Work Plan	0	45,813	0	45,813
Preliminary Design Study Vendor/Laboratory	0	21,481	0	21,481
Preliminary Design Studies	0	128,066	0	128,066
Subtotals	0	195,360	0	195,360
Totals	755,321	646,858	60,768	1,462,947

8. REFERENCES

Ashworth, S. C., 1998, *K Basin Sludge Polychlorinated Biphenyls Removal Technology Assessment*, EDT 624542, HNF-3095, Rev. 0, Cogema Engineering Corporation, Richland, Washington, August 1998.

Chambers, A. G., and Richardson, J. G., 2000, *INEEL Subsurface Disposal Area CERCLA-Based Technology Screening Model*, INEEL/EXT-2000-00158, March 2000.

DOE, 2000, *Report of the Secretary of Energy Advisory Board's Panel on Emerging Technological Alternatives to Incineration*, Secretary of Energy Advisory Board, U.S. Department of Energy, December 2000.

DOE-ID, 1997, *Comprehensive Remedial Investigation/Feasibility Study for the Test Area North Operable Unit 1-10 at the Idaho National Engineering and Environmental Laboratory*, DOE/ID-10557, Rev. 0, November 1997.

DOE-ID, 1999, *Final Record of Decision for Test Area North*, DOE/ID-10682, Rev. 0, October 1999.

DOE-ID, 2002a, *Comprehensive Remedial Design/Remedial Action Work Plan for the Test Area North, Waste Area Group 1, Operable Unit 1-10, Group 2 Sites*, DOE/ID-10875, Rev. 1, March 2002.

DOE-ID, 2002b, *Waste Acceptance Criteria for ICDF Landfill (Draft Final Title II)*, DOE/ID-10865, Rev. 2, Draft Final, April 2002.

EPA, 2002, *Section 3 Treatment Perspectives,* http://www.frtr.go/matrix2/section3/sec3_int.html, Web page visited March 8, 2002.

Hain, Kathleen E., Department of Energy Idaho Operations Office, to Wayne Pierre (U.S. Environmental Protection Agency) and Dean Nygard (Idaho Department of Environmental Quality), April 18, 2002, "Request for Concurrence with V-Tanks Path Forward," EM-ER-02-058.

Appendix A

Project Document Review Records

INEEL

PROJECT DOCUMENT REVIEW RECORD

DOCUMENT TITLE/DESCRIPTION: *Technology Evaluation Scope of Work for the V-Tanks, TSF-09/18, at Waste Area Group 1, Operable Unit 1-10 (Draft, Rev. 0)*

DATE: June 11, 2002 **REVIEWER:** Environmental Protection Agency

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
GENERAL COMMENTS				
1.	General		It is not clear why this Scope of Work (SOW) does not include information, such as schedule to implement the technology and cost of the technology (other than such information has yet to be received by BBWI). It appears that this document is premature. Information, such as which technological processes are viable, and cost and schedule to implement each technology, are necessary to perform an evaluation of these technologies.	No change to document. The purpose of the technology evaluation (TE) SOW is to outline the work necessary to obtain the data to perform a valid evaluation/comparison. The technology evaluation report, which will follow the TE SOW, will contain the information you are suggesting.

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DATE: June 11, 2002 **REVIEWER:** Environmental Protection Agency

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
SPECIFIC COMMENTS				
1.	§ 1.1	Page 3 (first paragraph)	While the V-tank personnel have agreed that the waste is PCB remediation waste, EPA recommends a brief explanation of how such a decision was reached be included in this section.	Comment incorporated. The text was changed as follows: "In accordance with the definition of polychlorinated biphenyl (PCB) remediation waste provided in the Toxic Substances Control Act outlined in 40 CFR 761, the V-Tank waste should qualify as PCB remediation waste, which allows disposal at a permitted landfill at any PCB concentration." A more thorough explanation, such as that provided below, will be contained in the technology evaluation report, which will have a section dedicated to "compliance with ARARs." From 40 CFR 761.3, "*PCB remediation waste* means waste containing PCBs as a result of a spill, release, or other unauthorized disposal." From 40 CFR 761.61(a)(4)(I), "*Bulk PCB remediation waste*. Bulk PCB remediation waste includes, but is not limited to, the following non-liquid PCB remediation waste: soil, sediments, dredged materials, muds, PCB sewage sludge, and industrial sludge." The source(s) of the PCBs are not known but are, presumably, from one or more leaks or releases of contaminated oil within facilities at TAN. The sludge, liquid, tanks, pipes, and other debris contaminated during remediation of the V-tanks qualify as remediation waste under the definitions provided by the EPA.

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DATE: June 11, 2002 **REVIEWER:** Environmental Protection Agency

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
2.	§ 3.2	Page 9 (Bullet #9)	Do Buildings 633 or 649 pose any potential interferences that must be addressed? If so, can any assumptions be made regarding their status at this time?	Comment incorporated. Based on information we've obtained to date from the ISV vendor, buildings greater than 8 feet from the centerline of the electrodes will not be affected. The following was added to the end of assumption #9: "Other adjacent buildings (TAN-607, -633, and -649) will not interfere with the remedial action."
3.	§ 4.2	Page 12 (1st bullet following discussion of additional early actions)	This bullet discusses removal of the approximately 6000 gals of liquid from V-3. While that represents a large volume of liquid, 1500 gals of liquid remain in the tank. Is such a large volume of liquid necessary? If it is necessary to remove the liquid, EPA recommends removing as much liquid as possible.	Comment incorporated. The amount of liquid left in the tank is based on comparable levels in the other tanks, the need to avoid entraining sludge, and anticipated requirements for the sludge removal system. If we can justify removing more water, we will certainly pursue that. The text was revised as follows: "It is anticipated that approximately 6,000 gal can be removed from tank V-3, leaving an amount of liquid comparable to that found in V-1 and V-2. This is judged to be enough liquid in the tanks to preclude entraining solids during the liquid removal process and provide sufficient liquid to readily allow for subsequent sludge removal. The removal process can be simplified from the previous approach by decanting the liquid portion without entraining the solids, thus simplifying the subsequent liquid treatment process. Depending on the capabilities of the removal system and on the treatment technology selected, additional liquid from each of the tanks may be removed."

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
4.	§ 4.3	Page 13	This lists 7 variations on the 3 main alternatives. If it is possible, EPA recommends reducing this list to those alternatives where proposals from vendors indicate such a technology exists commercially.	No change to document. The only alternative that is currently not available is off-INEEL disposal of the residual/grouted waste from the Thermal Desorption process. This alternative was retained because of our understanding that these disposal sites are actively seeking permission to accept out-of-state mixed wastes and to allow the public an opportunity to comment on an alternative where a significant portion of the waste is disposed of off-INEEL. All other alternatives appear to be commercially viable based on vendor responses.
5.	§ 5	Page 25 (3rd bullet)	This bullet discusses TSDFs that are "on-site" or "off-site". EPA recommends that the bullet be rewritten, referring to these TSDFs as being on the INEEL or off of the INEEL. Also, review the entire document for any additional references to "on-site" and/or "off-site", and make the same revisions.	Comment incorporated. A global search was performed and where applicable all "on-site" references were changed to "on-INEEL" and all "off-site" reference were changed to "off-INEEL."
6.	§ 7	Page 28	If possible, some effort should be made to overlay the projected RCRA remediation and closure schedule with the CERCLA remediation of the site. Remember that both efforts are to be coordinated in order to not duplicate efforts.	No change to document. As indicated by DOE in the 6-12-02 Agency RPM call, the schedule for the submittal of the V-tanks closure plan will be accelerated to the extent possible, but due to current funding constraints it will likely not be possible for the closure plan to be issued for public comment on the same day the V-tanks proposed plan is issued for public comment. Also, the closure plan, while pertinent to the project, is outside the scope of this SOW. For these reasons, inclusion of the closure plan schedule into this SOW is not recommended.

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DATE: June 11, 2002 **REVIEWER:** Environmental Protection Agency

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
7.	7.2	Page 30 (Draft ROD Amend-ment schedule)	The schedule for the submission of the draft ROD could be reduced by 1 month by starting the writing of the ROD Amendment at the beginning of the public comment period. Since much of the ROD Amendment will consist of background information and descriptions of alternatives it is possible to develop that portion of the Amendment prior to the completion of the public comment period. There remains one month to complete the writing of the selected alternative based on public comment.	No change to document. Every effort will be made to speed the proposed plan and ROD amendment process along. Schedule activity 0120 in Figure 10 does show a preliminary draft of the ROD amendment being prepared concurrent with the preparation of the proposed plan. This is well in advance of the public comment period. Work on the ROD amendment will continue to the extent possible while the proposed plan is out for public comment, and as soon as public comments start coming in, the work on the responsiveness summary will begin.

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DATE: June 4, 2002 **REVIEWER:** IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
GENERAL COMMENTS				
1.	General		Overall, this Technology Evaluation SOW concurs with much of the information presented to date concerning the on-going V-tanks remedial planning and design. The flow diagrams particularly concur with and illustrate well information that has been presented and discussed in the past months amongst the WAG-1 group. However, the scheduling for tasks and deliverables (Section 7, Table 4 and Figure 10) differ somewhat from the information that was submitted to the agencies on 5/3/02, and discussed on a 5/6/02 conference call. For example in Table 4, under the **"V-Tanks Technology Evaluation Report"** the "V-Tanks Technology Evaluation Fact Sheet" indicates a submittal date and a seven-day review. The information we received earlier in May apparently indicates a Fact Sheet preparation, and submittal for a 30-day public review plus a 30-day period for evaluation of the public input. Included under the **"V-Tanks Proposed Plan and ROD Amendment"** is the inclusion of a "Draft Proposed Plan and *Preliminary Draft ROD Amendment*". It is assumed the latter deliverable is a bootleg copy for agency initial review. This has not been discussed to date. However, it is assumed the schedules shown in Table 4 and Figure 10 are a refinement of the schedule information provided on 5/3/02, and will again be subject to discussion during comment review and resolution.	Comment incorporated. The summary schedule provided on 5-3-02 was a higher level summary to show overall time frames. The schedule in the TE SOW is more detailed and specific in terms of dates and durations. The seven-day informal review for the Fact Sheet applies to the agencies, not the public, and it does match what was provided to the Agencies in the 3-12-02 scoping meeting. The column heading in Table 4 was revised to clarify this. The schedule in Figure 10 of the TE SOW also shows the public review of the proposed plan which will be after the Agency review and comment incorporation. The duration of the public review is shown as 60 days in order to allow for a 30 day extension request by the public. It is correct that the Preliminary Draft ROD Amendment is an advance Agency review with the formal review of the Proposed Plan. This was also shown in information presented in the 3-12-02 scoping meeting. To avoid confusion, Table 4 will be revised to indicate just "Draft Proposed Plan" as the deliverable with a footnote that says "A preliminary draft ROD Amendment will be provided with the draft proposed plan for an informal Agency review.".

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DATE: June 4, 2002 **REVIEWER:** IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
2.	General		Also, it is assumed, based on recent information pertaining to the non-participation of several vendors in the RFI process, and one request for an extension for the submittal (end of June), there may be a schedule delay that will have to be reflected in revisions to Table 4 and Figure 10.	No change to document. The limited vendor response may cause a schedule delay, but efforts are underway to recover. To maintain consistency with our project baseline, the delay will be tracked as a variance/trend rather than changing the schedule.
SPECIFIC COMMENTS				
1.	§ 1.1	Page 1 (Table 1) and Page 2 (last paragraph)	Please clarify again the nature of the V-9 tank contents. Is the liquid fraction still as high as 70 gallons?	Comment incorporated. The last two sentences of the subject paragraph were deleted and additional wording was added to footnote b of Table 3 as follows: "b. Weighted average using volume data from Table 1. Note that current plans are to only remove and treat a major portion of the liquid in V-3 separately. The remaining liquid and sludge in each tank will be treated together." The volume data in Table 1 is accurate based on currently available data. Due to the limited volume of liquid in V-9, there are no plans to attempt to remove the liquid portion separately. Also, the following information was added to section 4.3, Alternatives: "Consequently, the material to be treated by each alternative will consist of a combination of liquid and sludge as follows (refer to Table 1): • V-1: 520 gallons of sludge, plus 1164 gallons of liquid • V-2: 520 gallons of sludge, plus 1076 gallons of liquid • V-3: 652 gallons of sludge, plus 1648 gallons of liquid • V-9: 250 gallons of sludge, plus 70 gallons of liquid"

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ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
2.	§ 3.2	Page 9 (Assump-tion #9)	Please cite the source for the assumption that buildings TAN-615/616 will be removed to their foundations in fiscal year 2004.	Comment incorporated. The source of this assumption is documented in the Detailed Work Plan that outlines the site's plans for the next 3 years. This reference was added to the assumption as follows: "Per the Detailed Work Plan, TAN-615/616 will be removed down to their foundations in fiscal year 2004, eliminating interference issues with V-tank remedial actions planned for fiscal year 2005."
3.	§ 4.2	Page 12 (Bullet #7)	Please cite the source for the assumption that buildings TAN-615/616 will be removed to their foundations in fiscal year 2004.	Comment incorporated. The source of this assumption is documented in the Detailed Work Plan that outlines the site's plans for the next 3 years. This reference was added to the bullet as follows: "The current decontamination and demolition plan outlined in the Detailed Work Plan for these two buildings calls for major activities to be conducted in parallel with the V-tank early remedial actions."
4.	§ 4.3.1	Page 15 (top paragraph, first complete sentence)	Previous in-situ vitrification presentations, and the actual tank melts conducted at Hanford by Geomelt, have always indicated that the installation of vent pipes is the preferred way to direct and capture off-gases created during the melt, and more importantly preclude pressure buildup. The "Existing tank lines and portals ..." are not designed for the purpose of safe and efficient venting of gases and vapors to the surface hood for capture and treatment. Please discuss.	Comment incorporated. Note that there are 2 existing lines to the ground surface that are 3-6 " dia and the manway portal is 22 " dia. These "vents" may be sufficient to capture the off-gas generated within the tank, but this will be determined during the detailed design phase. The wording in the document was revised as follows: "Existing tank lines and portals would be used to the extent possible and additional vent lines added as necessary to direct and capture most of the off-gases and preclude pressure buildup."

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DATE: June 4, 2002 REVIEWER: IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
5.	§ 4.3.1	Page 15 (last paragraph of section)	The contingency discussed here states that there may be the need "to consider leaving the melt in place with an appropriate cap and the associated monitoring". This option will require an updated detailed evaluation, including costs and the attendant regulatory requirements (ARARs), separate from that discussed in the feasibility study. Please discuss how and where this will be done.	Comment incorporated. There is no intent at this point to evaluate the alternative of leaving the melt in place. This paragraph was only included as a contingency in the event removal of the melt became unworkable. Based on expected exposure levels and previous experience by Geomelt in removing the melt, the removal option appears viable. The wording in the document was revised as follows: "In the event removal of the melt and disposal at the ICDF proves impractical (because of high cost/exposure, for example), it may become necessary to consider leaving the melt in place with an appropriate cap and the associated monitoring. This alternative was evaluated previously in the feasibility study, but no attempt will be made at this stage of the evaluation process to evaluate this alternative unless the removal option is shown to be unworkable."

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DATE: June 4, 2002 **REVIEWER:** IDEQ

ITEM NUMBER	SECTION NUMBER	PAGE NUMBER	COMMENT	RESOLUTION
6.	§ 4.3.4	Page 18 and Page 19 (Figure 6)	It is not clear what the "non-thermal process on-site" for treatment of organics from the off-gas treatment unit is. The other alternatives, where applicable, indicate "stabilization" as the preferred treatment for the off-gas residues. Please discuss.	Comment incorporated. After a review of the process flow diagram with INEEL off-gas experts, their recommendation is to also allow for the possibility of treating these organics via a thermal process. The key point is that for thermal desorption (TD), the organics are not destroyed, only separated. Therefore, additional treatment is required to reduce the concentrations of organic constituents (such as PCBs) below LDRs. Since these are destroyed by the other technologies (vit., chem. ox.), stabilization is acceptable, whereas TD requires additional treatment prior to stabilization. The reason we initially assumed non-thermal was a potential concern from the public. However, our technical experts indicate that thermal treatment may be preferable and when used simply to treat the off-gas, the concerns about it being viewed by the public as an incinerator are diminished. We are not certain what the off-gas treatment processes will actually be at this point, and have therefore left it vague. Early indications are that the preferred unit operation will be thermal oxidizer. The wording for Alternative 2.b has been changed as follows: "Figure 6 is a process flow diagram for this alternative. This alternative is identical to Alternative 2.a, except the secondary waste streams are treated on-INEEL. Based on the conceptual design studies, the exact treatment process for this waste stream will be determined. These could include thermal and non-thermal means of destroying the organics."